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The THERAPEUTIC GAZETTE

INCORPORATING

MEDICINE AND THE MEDICAL AGE

A Monthly Journal of Practical Therapeutics

Edited by

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ORIGINAL COMMUNICATIONS.

A THERAPEUTIC CONTRIBUTION TO THE SUBJECT OF THE MIGRAINES.

BY TOM A. WILLIAMS, M.B., C.M. EDIN., WASHINGTON, D. C.,

Lecturer on Nervous and Mental Diseases, Howard University; Corresponding Member Soc. de Neurol. et Soc. de Psychol., Paris, etc.; Neurologist to Freedmen's Hospital.

In following the history of migrainous individuals, the frequency of vascular disease in after life is conspicuous. Not only is this so when the headaches are of the classical variety, paroxysmal, unilateral, with nausea and vomiting and often scotoma; but when headaches are more dull, longer continued, or without nausea and vomiting or scotoma. Furthermore, therapeusis which has proved so successful in cases of chronic dull headache is equally efficacious in recurrent hemicrania.

Furthermore, the measures employed are similar to those beneficial in the forms of vascular disease (see Antecedents of High Blood-pressure and Nervousness, Monthly Cyclopedia, 1911) which are so apt to follow long-standing recurrent headache.

As *curationes naturam morborum ostendunt*, a common pathogenesis should be sought for in these conditions. This contribution is an attempt to gather certain clinical facts in that direction, although the proof requires further considerable data to be gained only in the laboratory. The nature of these will be more appreciable when the clinical facts are perused.

To prevent undue length, no considerations concerning differential diagnosis have been mentioned, nor in each case have the details been completely furnished, nor has any tabulation of symptoms and treatment been attempted; for the object of the presentation is merely to draw attention to a mode of investigation of a disease which was formerly regarded as inexplicable because hereditary, and before which therapeusis was supposed to be helpless. Regarding diagnosis, a warning is necessary that the symptoms of a long-standing headache due to organic cerebral changes can at first scarcely be differentiated from those due to chemical vices, until clinical signs of the former begin to show themselves. These remarks apply particularly to cases of serositis, more particularly when localized, and especially that due to interference with the calcium balance. In such headaches the treatment must be quite different from that advocated in this communication concerning migraine.

The improvement of the toxic form of headache which we are considering sometimes effected by treatment directed to the assimilative function is quite in consonance with the explanations now presented. For it is not the improvement of digestion *per se* which cures headaches, but the bettering of metabolism incidental to the new diet the patient is made to take. Another error regarding the pathogenesis of periodic headaches is to attribute them to the menstrual function itself, whereas menstruation is a disturber of metabolism in certain instances, and hence aggravates a toxicosis already latent. Even in some cases in which eye-strain may be incriminated the metabolic factor may be important, as in Dr. Wilmer's case in this paper.

The recurrent headaches due to endo-

crine disorders have not been considered here, although it is possible that the activators of metabolism furnished by internal secretions may play a considerable part in those dealt with. In some of the cases here described and in others not inserted, endocrine hormones have been given in the attempt to better metabolism; but the material is insufficient to furnish a conclusion in so complicated a matter.

The cases which follow are presented in order to illustrate the relationship between migraine proper and chronic toxic headache. They are divided into three types: first, headache whether migrainous or not, accompanied by increased vascular tension; second, cases of classical migraine; third, cases of chronic headache without migrainous features.

CASES WITH INCREASED VASCULAR TENSION.

Case 1.—Recurrent headache since childhood. A woman of forty-eight was referred in March, 1915, by Dr. Howard Kelly, Baltimore, because of headache and insomnia. The former had occurred since childhood, but for eight months had been very severe and almost weekly in occurrence. It commenced at night and always lasted until sleep, and sometimes for two days. Nothing relieved it. There was no nausea, scotoma, or vomiting, although usually slight constipation. She slept only about four hours a night, being wakeful and sleep always ceasing very early in the morning. The feet would be cold and the body perspiring, hot and cold alternately. Albolene for six weeks had not relieved the headaches. Although the digestion had been incriminated and she had eaten no fried food or pastry, and had latterly given up milk, custard, and sweets, no relief had been obtained. She was a very strong, active woman, but adipose.

Examination: The reflexes were overactive, the fat slightly hyperesthetic; the blood-pressure was 175, diastolic 125, the vessel walls soft. At the base of the optic papilla there was slight indistinctness, but no bulging.

The urine was normal, and there was no extra micturition in the nights except during headache attacks, after which diuresis was very copious.

Under appropriate treatment the blood-pressure fell by stages to 150-105, 145-95, 138-98, 140-90, 126-88, with only one headache in eighteen days. Four weeks after I saw her, however, there was one very violent headache, with a blood-pressure of 150-108. Two days later a slight blurring of the disk occurred.

In June there was one slight headache, and she awoke with one very severe one, which was stopped by sweating and massage at 2 P.M. Ten days after this the blood-pressure was 130-90, and while standing up 124-78. The rest of the summer continued without headache; but one occurred in November after a fall. The blood-pressure at that time was 145-90 and 150-100 on different occasions. She had, however, ceased taking cereal for fear of adiposity, and had ceased milk also. This was rectified, and since then I understand from Dr. Kaufman, the patient's physician, that she remains comfortable and free of headache.

Case 2.—Simple matutinal headache; eyestrain. A woman aged forty-three was referred by Dr. Wilmer because of morning headaches since the age of twenty-five, for which an ocular muscle unbalance was in his opinion not entirely accountable. On account of her feeling that she could not control herself and of the melancholy induced thereby, Dr. Wilmer believed that neurological treatment might prepare the patient for a tendon advancement, which he was unwilling to undertake otherwise, as two previous tenotomies at different hands had failed to relieve the headaches.

Examination showed no organic defects; but a blood-pressure of 158-112, which, on standing up, did not rise. There was no constipation; but she had greatly restricted the carbohydrates for a year and had thus reduced her weight from 225 to 170 pounds.

I considered it desirable to have the kidney function tested, and Dr. Hagner reported 50 per cent return of phenolsulphonephthalein in forty minutes.

In the meantime she was given standard

low protein diet, baths, and massage, and advised to occupy herself as much as possible. In six days the blood-pressure had fallen to 136-90, standing 120-86, although lying down it was 150-100.

Headache still persisted, and she felt tired all the time. In two weeks the blood-pressure was 132-89 while in hospital preparing for operation. This was successfully performed; she made a good convalescence, and in a few weeks was quite comfortable and free from headache. The increase of weight by the badly balanced diet was later met by diminution of fat and cereals without detriment to the general health.

Case 3.—Migraine followed by arteriosclerosis. A woman of fifty-seven was referred by Surgeon-General Blue, March, 1916, because of dizziness, general nervousness, and pains in the leg which interfered with sleep. She had formerly had migrainous headaches, but these had diminished for some years. There were no neurological signs, but the blood-pressure was 220-143, standing 215-150, and the left dorsalis pedis and the right posterior tibial arteries were markedly sclerosed. The pulse-rate would rise to 120 at times; it was usually about 90. The nose bled at times.

The patient was given appropriate diet and baths; but soon had to return home because of her daughter's illness. The case is given as an illustration of the well-known disappearance of periodic headaches in certain persons as age advances, and to illustrate the frequent relationship of this with high arterial tension, and in order that these observations may be compared with the fact that many cases of high arterial tension without headache are frequently modified by the mode of treatment which benefits the headache.

CASES OF TYPICAL MIGRAINE.

The first of these cases showed also arterial hypertension; but both regarding heredity and the nature of the headaches it was typical hemicrania.

Case 4.—Classical migraine illustrating successful therapeutics. A physician, aged thirty-eight, consulted me in April, 1915, for a periodic headache since boyhood, a true migraine, increasing as he grew older. All his brothers and sisters and his father were affected, and there were migrainous headaches on the other side of the family also.

The attack is classical, beginning usually on the right temple, extending quickly to the occiput. Glasses improved him slightly while in the medical school, when his astigmatism aggravated the headaches. They used to come every two or three months, but for six years past have been increasing in frequency and intensity, although they may be postponed for a day by aspirin.

Other important negative facts are incipient tuberculosis after graduation, a frontal sinus infection while treating this in the southwest, an estivo-autumnal fever since 1905, ptomaine poisoning in 1910, since which he has had a feeling of severe malaise relieved by diarrhea about every two weeks. A gastroenterologist thought a gastric ulcer with pyloric stenosis was the cause of this, and explained in this way a gastric hyperacidity. After his treatment the diarrhea was less frequent, but the headaches became still worse, and neuralgia every four days made life almost intolerable, as he had been only free for two weeks the whole winter. Alcohol would always provoke a headache the next day.

Examination showed overactive reflexes, small but active pupils, and clean tongue. Blood-pressure 153, with 98 diastolic.

Treatment: The patient was treated appropriately. Six weeks later he wrote me: "I want to take this opportunity to express to you in part my great appreciation of what you have done for me in curing me of my headaches. It is like living in another world to be free from them. I am able to eat all the green vegetables and fruit now, something I have not been able to do for several years. To be free from those terrible head pains is like a dream to me, almost too good to be true." A year later he remains well.

Case 5.—Migraine developing into cervical neuralgia. A physician's wife, aged forty, had had severe migraine headaches

increasing in frequency since about the age of twenty. Latterly they had become so much worse that she had been induced to consult me, because of a neuralgic disturbance in the neck and shoulders, in the belief that this could be relieved, although she had been most skeptical as to any possibility of relief from the headaches when spoken to concerning them some years before, when she had refused to consult me.

Examination showed no abnormalities nor increase of blood-pressure, although she was of a very tense, nervous temperament. Her diet, however, which she believed to be very simple and without connection with her illness, was as follows:

Breakfast: Cereal, 2 eggs, muffins, coffee, no fruit.

Cocoa occasionally at eleven o'clock.

Luncheon: Hearty dinner; no sweets, no tea; may eat an apple; water.

Dinner: Meat and vegetables; sweets rarely; water.

Fruit between meals rarely.

She was prescribed treatment similar to the other cases; and the result was that in spite of considerable occasional imprudence in diet and an excessive expenditure of nervous energy, she is sometimes free from headaches for months, rarely has them severely, and is now able to perform her exacting social duties and indulge her musical tastes better than she has ever before done, in spite of chronic appendicitis and several severe attacks of grippe during the last three years.

Case 6.—Intense and increasing headaches with neural involvement and tachycardia. A woman, aged forty, was referred by Dr. Wynkoop in May, 1912, because of intensely severe recurrent headaches since the age of eleven. At first they had only lasted a few hours, but for some years they would last for three days intensely, and less so for two days longer. They were preceded by scotoma, characterized by throbbing, accompanied by great nervousness, exhaustion, sensation of hard beating of the pulse, pain all over the body. They generally were associated with menstruation. Her father and brother have similar headaches. She has frequently albuminuria, and during gestation the urine showed 40 per cent of albumin.

Examination showed active reflexes, blood-pressure 162, diastolic 110; pulse-rate 120; slight cardiac dilatation, apex being in the sixth interspace and right border one inch outside of sternum. The reflexes were very active. There was some tremor, but not of a toxic type, and the Quinquaud sign was absent. Believing that high blood-pressure and tachycardia might be due to nervous excitement on account of examination, I saw her again the following day and found the blood-pressure 136 and the pulse 90, tremor absent. Observations taken at home showed:

Pulse—Saturday, 6 A.M., asleep, in bed, 72; 6 P.M., resting after 50-yard slow walk, 112 to 100; 10 P.M., resting, going to bed, 90. Sunday, 6 A.M., asleep in bed, 70 to 72; 10 A.M., reading—quiet all morning, 92; 12.30 P.M., light housework, 108.

The hemoglobin content was normal; constipation was troublesome, as she had had it for years, and always took cascarin or enemata. The digestion was heavy, with acidity, and she slept after meals. The diet was as follows:

Breakfast: Cereal, bread, strong coffee, rarely an egg.

Lunch: Weak tea, bread, cold meat, cooked fruit.

Dinner: Abundant because she was always very hungry then—about two ounces of meat and strong coffee taken.

Treatment: She was told to limit the amount of protein in the diet, but above all to increase the succulent and saline content, and that her dread of acidity because of carbohydrates and sweet foods was groundless. These measures she carried out; and although on account of other considerations I did not see her again, the headaches became far less frequent and less intense.

ATYPICAL MIGRAINE OR DIFFUSE RECURRENT HEADACHES.

Case 7.—Migraine resembling petit mal, due to metabolic disorder. A bacteriologist, aged thirty, was referred in the spring of

1912 by Dr. Paul Johnston because of attacks he calls "bilious" (but not accompanied nor preceded by constipation), which produce headache, preceded by numbness and pricking in the fingers, followed by dizziness, mental confusion, and foolish talk of paraphasic type, without loss of consciousness. These attacks have occurred every two or three months since the age of twenty-two; they are of very short duration. There were no scotomata, but they were formerly accompanied by vomiting. The headache is of the splitting kind, lasts all day, and is followed by dulness and slowness of thought the day following. The capacity to concentrate his thoughts is increasingly impaired even between the attacks. He is at times irritable. He has no bad habits, and apart from these attacks he is well and strong.

He received a blow on the left side of the head as a boy, and there is still a dent in the left parietal region, upon which side the headache more often occurs. He has a large appetite, which he says he controls, but he eats meat thrice a day, although he says sparingly; takes no alcohol. The blood-pressure is not raised, the reflexes and sensibility are normal.

Treatment: He was given the low protein "standard" diet. He wrote me the following winter: "Since I have increased the quantity of vegetables I have had no recurrence of those spells." Dr. Johnston informs me that he remained well to date—years later.

The clinical relationship of migraine to epilepsy has been emphasized strongly by Gowers, who has collected a number of cases in which one of these manifestations seems to be convertible with the other. To discuss this problem would lead too far for the object of this paper. However, a treatment similar to that employed by me for migraine has been successful in certain types of epilepsy in young persons. (See *Review of Neurology and Psychiatry*, March, 1915; also *Interstate Medical Journal*, April, 1915.)

PATHOGENESIS.

The pathogenesis of this variety of headache must be noticed in all cases described in this paper. (I have many others which for lack of space are not inserted.) The dietetic balance has always been disproportionate in respect to an insufficiency of carbohydrates in relation to caloric need. In consequence there has been consumed what for the individual in question is an excess of protein. Now it must be remembered that the alkaline potentiality of the tissues is insufficient to permit of an exclusively protein diet. When full caloric need is satisfied, there will remain 25 per cent of protein intake unutilizable because of lack of alkali. This is converted into ammonium carbonate, which is disposed of in the urine in the carnivorous animals by conversion into other nitrogen compounds (Fisher). Now most individuals can dispose of an excessive amount of nitrogen by such conversions; but when hepatic or renal sufficiency is impaired this cannot be done. The accumulation of unexcreted protein produces tissue acidosis; acidosis in turn causes hydrolysis, that is edema, which produces swelling. The actual occurrence of cerebral edema in migraine is undemonstrated; but we know of no reason against its occurrence. If it is so, the meningeal capsule must be stretched, dragged upon, and such dragging is supposed to be the only source of pain inside the cranium.

The Question of Lateralization.—If this be the correct interpretation, we have still to ask why a general toxic state and edema caused by hyperproteosis manifests itself unilaterally as in the classical hemicrania. This question is not insuperable, for the lateralization of edema even in the periphery often occurs, in consequence of vascular and neural irregularities, posture, tissue asymmetry, and topographical peculiarities. In addition to these factors, we have those of right- and left-handedness, absence of bilaterality in the innominate artery and vein, in the portal and hemorrhoidal circulation, in the stomach and liver. We have

also the different course of the right and left vagus and the difference of topography of the right and left lung, as well as the asymmetrical posture due to one's position in writing.

These lateralizing factors may, however, be entirely outweighed by the general ones. In the latter case, we have bilateral or diffuse headache; in the former, hemicrania. Lateralization, however, may be determined by the factors which induce referred pains, such as unilateral inflammatory affection of viscera or other tissue.

The kind of protein seems to be of importance in cases of arterial hypertension (Eustis). Whether it be so in migraine has yet to be ascertained. By kind of protein we mean the relative amount of the different amino-acids furnished by its splitting up.

There are other problems to work out regarding the metabolism in migrainous individuals. There are obstacles to this in the case of private patients, which is all my position permits me to deal with at present. Such questions are the relation of the migraine attack to the amount of non-protein nitrogen in the blood; the relation of the attack to fluctuation in renal and hepatic sufficiency; the relation of the attack to variations in cardiac potency; the relation of the attack to the vago-tonic or sympathetic-tonic states.

Valuable information will be derived from the elucidation of these questions—for instance, the headache which sometimes occurs in the early stages of frontal tumors has clinical resemblance to the diffuse toxic headache, and for a while may be relieved by similar measures, because perhaps of the aggravation of intracranial hypertension by a slight toxicity, the removal of which abrogates for a while the tension headache, thus leading to an error in prognosis.

THE PRINCIPLES OF THE TREATMENT.

The important point to bear in mind is that a hyperaminosis occurs in every individual as soon as the protein intake exceeds the alkaline valence of the tissues. Although the manifestations of this are various, we are considering only that of headache.

The object, however, is not only to diminish the protein intake, but to improve the metabolic capacity. In this there are two important other principles concerned.

The first principle of treatment is to aim at adequate combustion. This is to be secured only by a sufficiency of carbohydrates and fats, more particularly the former. For when the protein balance has been impaired, acidosis is imminent, and lack of alkalinity interferes with the due saponification of fats. Besides which, the fats make a large demand upon the alkaline juices while being emulsified, and they are difficult to oxidize afterwards; whereas the carbohydrates are exceedingly labile and are indeed only with difficulty stored up by means of the pancreatic hormone balancing the lytic hormones of the adrenal and pituitary glands still further activated by the juice of the thyroid. Here the absence of the utilization of the carbohydrates eventuates in the acidosis found in diabetes. Another fact showing the importance of the carbohydrates is that an experimental aminolytic edema of a limb can be immediately cleared up by the intravenous injection of glucose, even when alkali entirely fails to influence it (Fisher).

The second principle of treatment is the furtherance of the saline tissue-exchange. By this is meant the facilitation of metabolism secured by the ingestion of the salts of the alkalies. Schmiedeberg (*The Principles of Pharmacology*) showed twenty years ago how the excretion of water was favored by these, more especially when sodium and potassium were played against each other separately.

Numerous experiments since have shown how the alkalies thus favored the labilization of nerve tissue, while the alkaline earths favor stabilization.

The practical method for securing these three needs is:

First: Limit the protein to a maximum of 50 grammes per day, which Chittenden has found to be an adequate standard for body maintenance.

Second: Maintain caloric need by suffi-

ciency of carbohydrate to the amount of about three or four times dry-weight greater than the protein intake.

Third: Supplement this by a moderate amount of fat.

Fourth: Give sufficiency of salines in the form of fruits and vegetables.

Complementary Measures.—In addition to these essentials, many subsidiary measures may have to be utilized in accordance with the individual's peculiarities or in relation to other symptoms. Thus, constipation must be prevented because of the consequent absorption of proteins particularly poisonous to the tissues. This must not be done by the drastic measure of purgation by neuromuscular poisons or by hydragogue cathartics, but by supplementing a model diet which already has a tendency to prevent constipation by an increase of cellulose, of fiber, of saline constituents, and perhaps by oil. Sometimes enemata are required, and in a few cases ox bile is essential. In certain cases hypometabolism will not be quickened by these measures. This is usually because of the lack of necessary hormones. In these patients that of the thyroid in particular may be of value.

Thus the migraines are no exception to the therapeutic rule that each case must be considered in full detail, and that no routine treatment can promise success.

THE REPORT OF THE DEPARTMENT OF RADIUM THERAPY AT JEFFERSON COLLEGE HOSPITAL.

BY W. S. NEWCOMET, M.D.,
Radiologist to the Jefferson College Hospital, Philadelphia.

Since the establishment at Jefferson College of the Department of Radium Therapy, made possible by the establishment of the "Lucy B. Henderson Foundation," its energy has been devoted entirely to the field of radiology. During this last year, under great difficulties, owing to the present condition of obtaining both material and suitable skilled labor, the necessary apparatus has been installed for the separation of the "emanation" and "active deposit," and it is expected that this will lead both to a broadening of the field of usefulness, and to the greater employment of radium in internal medicine.

While a diversity of opinion exists as to the usefulness of radium in medicine, it must be admitted that in a limited field it has accomplished results which cannot be duplicated by any other known agent. Just why these results are produced, while in other instances almost parallel radium fails, cannot be answered, and therefore further careful study is needed in the hope that with the refinement of technique certain conditions now not under control will likewise respond.

In the last two years 133 cases have been treated, with more or less improvement in 47, as is shown by the following table:

CLASSIFICATION OF DISEASES.

Angiomata:		Gumma	3
Arm and breast	1	Keratosis nose	1
Face	4	Leukoplakia	1
Face and neck	2	Liver (enlarged)	1
Lip	1	Papilloma:	
Upper lip	1	Larynx	1
Tongue	1	Mouth	1
Cavernous	2	Rhinoscleroma	1
Scalp	1	Rodent ulcer	1
Mole	2	Sarcoma	11
Nevus:		Sinus	1
Nose	1	Splenomegaly	1
Face	1	Tinnitus aurium	1
Angiopapilloma, mouth	1	Tuberculous glands	1
Carcinoma	59	Tuberculous sinus	1
Cheilitis	1	Tuberculous prostate	1
Cystadenoma rectum	1	Ulcer:	
Endothelioma	1	Eye	1
Epithelioma	14	Lip	1
Fibroid	5	Undiagnosed	1
Goitre	1		

In this table no attempt has been made to show the result of treatment, as this and other details will be given in the following table:

CASES TREATED—DIAGNOSIS AND RESULTS.

No.	Date.	Name.	Referred by:	Age.	M. or F.	M., S. or W.	Diagnosis.	Treatment.	Result.	Remarks.
1	12/ 2/14	M. J. K.	Dr. W. D. Robinson.	61	F.	M.	Carcinoma of pelvis.	Radium, followed by x-ray.	Much improved.	See notes.
2	12/14/14	J. P.	Dr. Bland.	55	M.	M.	Epithelioma of floor of mouth.	.....	Negative.	
3	12/29/14	P. D.	Dr. F. T. Stewart.	38	M.	S.	Sarcoma of buttock.	56 treatments, 9855 mg. hrs.	Size of tumor decreased.	Sent to Oncologic Hospital for treatment. Died.
4	1/ 6/15	A. G.	Dr. Bland.	38	F.	M.	Carcinoma of cervix.	Radium to vaginal ulcer.	Improved.	Case became operable and hysterectomy was performed.
5	1/ 8/15	W. D.	.....	70	M.	M.	Carcinoma of hard and soft palate.	.....	Negative.	
6	1/19/15	J. E. C.	Dr. Brittingham.	72	M.	W.	Carcinoma of tongue.	.....	Negative.	Discontinued treatment 2/17/15. Died 7/10/15.
7	1/12/15	XXX	Dr. J. Chalmers DaCosta.	45	M.	M.	Papilloma of mucous membrane of mouth.	Radium to ulcer.	W. M. E. D.	No recurrence December, 1916.
8	1/16/15	XXX.	Dr. Weisenberg.	68	M.	M.	Prostatic carcinoma.	Radium. Rectum, perineum, and suprapubic.	Improved.	After treated in another institution, and is still in fair health.
9	1/17/15	M. M.	Dr. L. Solis Cohen.	71	F.	S.	Goitre.	.....	.....	Patient received one treatment and decided not to return. No history taken.
10	1/18/15	L. DeH.	Dr. Peterson.	57	F.	S.	Adenocarcinoma of uterus.	Radium, xx mg., to body of uterus.	Much improved.	See notes. Examined Jan. 11, 1917. W. M. E. D.
11	1/20/15	J. V. C.	Skin O. P. D.	1	M.	S.	Angioma lower eyelid, cavernous.	759 mg. hrs.; 23 treatments.	Much improved.	
12	1/28/15	E. W.	.....	42	F.	W.	Fibroid, uterine.	Radium to body of uterus.	Bleeding checked; tumor became smaller.	Patient very fat. Operation for removal of remains of tumor Nov., 1916.
13	2/ 6/15	A. A.	Dr. J. B. Deaver.	38	M.	M.	Carcinoma of rectum.	Radium applied to mass.	Negative.	Failed to continue treatment.
14	2/ 6/15	O. D.	Dr. DaCosta.	35	M.	S.	Epithelioma of cheek.	.....	No improvement. Extirpated.	Wassermann positive.
15	2/ 8/15	XXX.	Dr. Watson	71	M.	M.	Carcinoma of larynx.	Radium applied externally.	W. M. E. D.	See notes.
16	2/11/15	M. B.	Dr. Nassau.	68	M.	M.	Round-cell sarcoma of palate.	.....	Died.	
17	2/11/15	J. B. L.	Dr. Joseph Sailer.	..	F.	M.	Splenomegaly.	Special report.	Improved.	See notes.
18	2/11/15	J. R. B.	Dr. W. D. Robinson.	39	M.	M.	Carcinoma of rectum.	Radium to mass.	W. M. E. D.	Patient in good health Dec., 1916. Dr. J. B. Deaver, referred for radium.
19	2/24/15	N. B. Y.	Ear O. P. D.	62	M.	M.	Tinnitus aurium	.....	Negative.	Radium applied to ex. aud. meatus
20	2/25/15	E. M.	Dr. DaCosta.	47	F.	S.	Papilloma floor of mouth.	Radium to ulcer.	W. M. E. D.	Has had a recurrence Jan., 1917.
21	3/ 1/15	H. F.	Child O. P. D.	10 mo.	F.	S.	Nevus of nose.	17 treatments, 561 mg. hrs.	Improved.	Result very good. See illustration.
22	3/ 6/15	W. L.	Dr. DaCosta.	34	M.	M.	Carcinoma of jaw.	19 treatments, 1254 mg. hrs.	Improved locally.	Operated on 4/9/15. Died 4/15/15.
23	3/ 6/15	M. O. D.	Dr. Reynolds.	81	M.	W.	Epithelioma of cheek.	18 treatments given daily, 1204 mg. hrs.	W. M. E. D.	
24	3/ 7/15	C. H.	Dr. Montgomery.	38	F.	S.	Recurrent carcinoma of intestines.	5 treatments, 600 mg. hrs.	Negative.	
25	3/21/15	J. H.	Dr. Nassau.	30	M.	M.	Endothelioma of brain.	Postoperative.	.....	Impossible to give value of treatments.
26	3/10/15	E. P.	Dr. Lytle.	17	F.	S.	Angioma of left hand and arm.	17 treatments. 984 mg. hrs.	No improvement.	Referred to Oncologic Hospital.
27	4/10/15	P. M.	Dr. Stewart. O. P. D.	17	M.	S.	T. B. glands of neck.	....	Negative.	
28	3/18/15	O. M.	Dr. Montgomery.	32	F.	S.	Carcinoma of vagina.	9 treatments, 1080 mg. hrs.	Negative.	Irregular in treatments.
29	4/22/15	L. G.	Dr. Strouse. Skin Department.	3½	F.	S.	Nevus of face.	Under treatment	Improving.	Treatment began 4/6/16; very extensive.
30	4/26/15	F. W.	Dr. Schamberg.	4 mo.	M.	S.	Venous angioma of face and neck.	....	Left.	Other methods tried and failed.
31	.....	M. S.	Dr. Stewart. O. P. D.	31	F.	S.	Recurrent sarcoma of shoulder.	Radium.	Negative.	
32	4/12/15	A. R.	Dr. Fussell.	44	F.	S.	Recurrent carcinoma in pelvis.	7 treatments, 1688 mg. hrs.	Died 9/17/15.	
33	5/10/15	A. R.	Dr. Reeves.	54	F.	M.	Angioma of face.	Radium to the surface.	Improved.	Still under treatment, and illustrations.
34	6/ 3/15	W. J. B.	Mr. Wm. Potter.	62	M.	M.	Chronic ulcer of left upper eyelid. (Epithelioma.)	.....	W. M. E. D.	See notes.
35	6/ 7/15	S. H. D.	.....	60	M.	M.	Keratosis of nose.	.....	W. M. E. D.	See notes.
36	6/ 7/15	H. S.	Dr. Boryell. Dr. Stiles.	2	M.	S.	Gliosarcoma of orbit.	Treated from June 12 to 26, 3560 mg. hrs.	Negative.	
37	3/23/15	J. F.	Dr. Shallow.	63	F.	M.	Papilloma of larynx.	Radium applied externally.	Negative.	For a time gave relief from pain.
38	6/29/15	H. P.	Dr. Francis Murphy	1	F.	S.	Hemangioma of scalp.	Radium to the mass.	Good.	See notes.
39	.....	E. D.	Dr. Graham, C. W.	4 mo.	F.	S.	Hemangioma and malnutrition.	.....	Died.	Hospital case.
40	6/23/15	E. P.	Dr Henry Jump.	46	F.	S.	Sarcoma of pelvis.	Radium to vaginal ulcer, x-ray to abdomen.	Improved locally. Developed masses in upper abdomen, chest, etc.	Fibroid removed about a year ago.
41	5/11/15	Sr. M. St. L.	Dr. Peck.	48	F.	S.	Fibroid of uterus.	Radium to uterus.	W. M. E. D.	See notes.

42	7/13/15	G. P.	Dr. McClary.	42	F.	S.	Fibroid of uterus.	Radium to uterus.	W. M. E. D.	See notes.
43	5/10/15	C. W.	Dr. Service.	35	F.	M.	Tumor of liver.	.....	Negative.	
44	7/20/15	L. C.	Dr. H. M. Righter.	47	F.	M.	Carcinoma of cervix.	.....	.....	Did not continue treatment.
45	7/27/15	W. C.	Dr. J. W. Martin.	23	M.	S.	Angioma of face.	.....	.....	Did not continue treatment.
46	7/28/15	G. D. P.	Dr. Smith.	66	M.	M.	Epithelioma of cheek.	.....	Negative.	Did not continue treatment.
47	8/19/15	R. C.	Dr. Despard.	1	M.	S.	Hairy mole of cheek.	Radium to right side of face.	Hair was removed.	Illustration, see notes. Had a troublesome general eczema after treatment.
48	8/11/15	R. McG.	Dr. Bland.	49	F.	M.	Epithelioma of cervix.	Radium.	Negative.	
49	9/ 8/15	P. H.	Surgery C. Dr. E. J. Klopp.	14	F.	S.	Angioma of tongue.	4 treatments, 230 mg. hrs.	Result doubtful.	
50	9/13/15	J. M.	Skin O. P. D.	2	M.	S.	Hairy mole on forehead.	Radium to forehead.	Improved.	See notes and illustration.
51	9/28/15	J. F.	Skin O. P. D.	52	F.	M.	Rhinoscleroma.	3 treatments, 5 mg. hrs. at intervals.	Relief from pain.	No local improvement.
52	10/ 1/15	S. H.	Dr. Widdowson.	66	M.	M.	Epithelioma of cheek.	.....	Negative.	
53	10/ 8/15	A. E. S.	.....	41	M	S.	Chronic ulcer of lower lip.	Radium to lip.	W. M. E. D.	Nature of ulcer doubtful.
54	10/ 7/15	XXX.	.....	49	M.	S.	Epithelioma of cheek. Recurrence of rodent ulcer.	Radium.	W. M. E. D.	Operation and x-ray previous to radium treatment.
55	11/17/15	M. G. H.	Dr. Eves.	73	M.	M.	Carcinoma of left arytenoid.	Radium.	Improved.	12/28/16, has not materially changed. Report of Dr. E.
56	11/15/15	A. R.	Dr. ———.	49	F.	M.	Fibroid of uterus.	Radium to uterus.	Improved locally.	See notes.
57	11/ 9/15	XXX.	Dr. C. F. Nassau.	29	M.	M.	Sarcoma of left knee.	.....	Negative.	40 mg. were used in the treatment of this case; apparently increased growth.
58	11/12/15	G. O.	Dr. DaCosta.	52	M.	M.	Recurrent carcinoma of upper jaw.	.....	Negative.	
59	11/16/15	B. C.	Dr. Heckensmith.	20 mo.	F.	S.	Angioma of nose and forearm.	6 treatments, 480 mg. hrs.	.....	Did not return.
59a	12/ 4/15	C. F.	Woman's Hospital.	19 mo.	F.	S.	Hemangioma of face.	.....	.....	Not treated.
60	12/10/15	XXX.	Dr. B. C. Hirst.	45	F.	M.	Carcinoma of uterus.	9 treatments, 720 mg. hrs.	W. M. E. D.	Examined by Dr. H. in Dec., 1916.
60a	12/14/15	L. W.	Dr. G. Erety Shoemaker.	51	F.	..	Carcinoma of urethra.	9 treatments, 540 mg. hrs.	W. M. E. D.	See notes. Unusual result.
60b	12/18/15	H. A. H.	.....	..	M.	..	Indolent sinus.	3 treatments.	Improved.	
61	12/23/15	H. W. W.	Dr. E. J. Klopp.	..	M.	..	Leukoplakia.	5 treatments, 171 mg. hrs.	W. M. E. D.	
62	1/ 4/16	T. A. St. C.	Dr. Gibbon. O. P. Surgical.	72	M.	M.	Epithelioma of floor of mouth.	Radium to mouth.	Negative.	
63	1/ 3/16	A. W. S.	.....	55	M.	M.	Epithelioma of cheek.	.....	Negative.	
64	1/18/16	E. T.	Dr. L. Burns.	50	M.	M.	Carcinoma of larnyx.	Radium externally to neck.	Negative.	Post-mortem proved it to be T. B., tuberculous laryngitis.
65	1/18/16	W. N.	Dr. W. J. Hall.	65	M.	M.	Rodent ulcer of nose and x-ray dermatitis.	.....	Unknown.	Not treated.
66	2/ 7/16	A. B. D.	Dr. Lafferty.	69	F.	M.	Carcinoma of uterus.	3 treatments, 420 mg. hrs.	Negative.	Condition totally inoperable and radium not indicated. Metastasis to peritoneum and liver.
67	2/24/16	A. V.	Children's Hospital.	5 mo.	M.	S.	Hemangioma of upper lip.	.....	.....	Treatment deferred.
68	.....	C. C.	Dr. Rankin.	39	F.	..	Fibroid, uterine.	10 treatments.	Improved.	See notes.
69	2/28/16	M. M.	Dr. Stellwagon.	30	M.	..	Glandularis cheilitis posenitosa.	Radium to lips.	W. M. E. D.	See notes.
70	3/ 1/16	J. B.	Dr. Gibbons. O. P. D.	54	M.	S.	Sarcoma of neck.	.....	Negative.	
71	2/28/16	J. M.	Dr. Roth.	..	M.	..	Carcinoma of tongue.	.....	Negative.	
72	3/26/16	F. D.	Oncologic Hospital.	26	F.	..	Sarcoma of head.	640 mg. hrs.	Improved.	Recurrence followed about six months later.
73	4/ 5/16	E. H. I.	Dr. Conwell.	60	F.	M.	Epithelioma of nose.	.....	W. M. E. D.	See notes.
74	4/ 6/16	J. S.	Dr. Lau.	64	M.	..	Carcinoma of tongue.	.....	Negative.	
74a	4/14/16	XXX.	Dr. Girvin.	..	M.	..	Carcinoma of prostate.	4 treatments, 130 mg. 10 hrs.	Improved.	See notes. Mass smaller.
75	4/11/16	W. G. S. C.	.....	60	M.	M.	Carcinoma of larynx.	.....	Died.	
76	5/ 1/16	M. M.	Surgical B.	71	M.	M.	Epithelioma of floor of mouth.	10 treatments, 800 mg. hrs.	Condition worse.	Sent back to H. O. P. D. Surg. B.
77	5/ 1/16	C. M.	Dr. J. Coles Brick.	62	M.	M.	Cystadenoma of rectum.	20 mg. by rectum for 4 hours.	doubtful.	Still under treatment.
77a	5/ 7/16	W. H. H.	Dr. Thorington.	..	M	M.	Tuberculosis of prostate.	13 treatments, 1560 mg. hrs.	Improved.	Local condition disappeared. Died of T. B. meningitis.
78	5/13/16	H. C.	Dr. Taggart.	61	F.	M.	Epithelioma of lower left eyelid.	4 treatments, 240 mg. hrs.	W. M. E. D.	See notes and illustration.
79	5/26/16	G. T.	Dr. Girvin.	..	F.	M.	Carcinoma of cervix.	5 treatments' 400 mg. hrs.	Much improved.	Still in good condition.
79a	5/27/16	N. C.	Dr. Bland.	57	F.	M.	Postoperative carcinoma of cervix.	Radium to vaginal vault.		
79b	5/27/16	A.	.....	..	F.	M.	Undiagnosed.	3 treatments.	.....	History removed.
80	6/ 6/16	S. S.	Dr. E. J. Klopp.	2	F.	S.	Keloid from burn.	.....	.....	Prefers to wait until fall. Did not return.
81	6/ 1/16	A. B.	Dr. Bland.	41	F.	M.	Carcinoma of uterus.	8 treatments, 1120 mg. hrs.		
82	.....	XXX.	.....	..	F.	S.	Indolent sinus; T. B.; sinus over lower end of sternum.	3 treatments, 480 mg. hrs.	Improved.	Still under observation.
83	6/13/16	J. P.	.....	53	M.	..	Carcinoma of neck: ulceration of larynx, with mass upon neck.	2 treatments, 180 mg. hrs.	.....	Did not return.

CASES TREATED—DIAGNOSIS AND RESULTS—*Continued.*

No.	Date.	Name.	Referred by:	Age.	M. or F.	M., S. or W.	Diagnosis.	Treatment.	Result.	Remarks.
84	6/12/16	L. F.	Dr. Bland.	48	F.	M.	Epithelioma of cervix.	10 treatments, 2400 mg. hrs.	Negative.	
85	5/27/16	L. G.	Dr. Wiggins.	71	F.	W.	Epithelioma of face.	6 treatments, 480 mg. hrs., to large ulcer; 4 treatments, 160 mg. hrs., to small ulcer.	Negative.	
86	6/20/16	C. G.	Dr. Wiggins. Dr. Bland.	54	F.	S.	Uterine carcinoma.	16 treatments, 3583 mg. hrs.	Negative.	
87	7/ 7/16	A. W.	Dr. Ester, Jr.	32	F.	M.	Carcinoma of uterus.	5 treatments, 1100 mg. hrs.	Negative.	
88	7/10/16	C. S.	Dr. Heineberg.	62	F.	M.	Carcinoma of cervix.	6 treatments, 638 mg. hrs.		
89	7/10/16	W. I. K.	Dr. Uhle.	45	M.	M.	Prostatic carcinoma.	9 treatments, 2740 mg. hrs.	Unimproved.	
90	6/29/16	C. M.	Dr. B. C. Hirst.	44	F.	..	Carcinoma of vagina.	6 treatments, 1166 mg. hrs.	Improved.	W. M. E. D. Oct., 1916.
91	7/17/16	L. S.	Dr. Uhle.	25	M.	..	Carcinoma of bladder.	3 treatments, 400 mg. hrs.	Negative.	
92	7/18/16	E. A.	Dr. Watson.	81	F.	..	Carcinoma of pharynx and parotid.	13 treatments, 1130 mg. hrs.	Negative.	
93	7/ 1/16	C. H.	Dr. Huss.	6	F.	S.	Portwine mark on left side of face. Nevus.	Still under treatment.	.....	Under observation.
94	7/14/16	L. V.	Dr. Stewart. Dr. Mullen. Penna. Hospital.	15	F.	..	Angioma of face.	3 treatments, 200 mg. hrs.	Improved.	Mass about the size of a bean upon the under side of upper lip.
94a	7/24/16	M.	Penna. Hospital.	38	F.	M.	Carcinoma of cervix.	6 treatments, 1472 mg. hrs.	Negative.	
94b	8/ 3/16	P. McG.	Dr. Henry Wharton.	65	M.	..	Epithelioma of upper lip and mouth.	5 treatments, 364 mg. hrs.	.....	Failed to return.
95	8/ 8/16	I. T.	.....	70	M.	..	Carcinoma of tongue and floor of mouth.	11 treatments, 88 mg. hrs.	.....	Found to be specific. Was doubtful; small amount of radium used pending diagnosis.
96	8/15/16	J. K.	.....	40	M.	S.	Gumma of mouth.	Specific treatment.	Ulcer healed.	Found to be specific.
97	8/15/16	C. H. P.	.....	45	M.	..	Carcinoma of larynx and trachea.	3 treatments, 480 mg. hrs.	Negative.	
98	8/17/16	E. F.	Dr. Klopp. O. P. S. D	54	F.	..	Sarcoma of finger.	4 treatments, 32 mg. hrs.	.....	Left.
99	8/24/16	R. G.	Dr. E. J. Klopp.	65	F.	M.	Epithelioma of nose.	6 treatments, 880 mg. hrs.		
100	8/21/16	C. R.	Dr. Thornton. Drs. Baldwin & Allen. Methodist Hospital.	56	M.	M.	Carcinoma of rectum.	5 treatments, 500 mg. hrs.	Negative.	
101	8/21/16	I. B.	Dr. Richter.	34	F.	M.	Carcinoma of cervix.	8 treatments, 1360 mg. hrs.	Negative.	
102	9/11/16	L. K.	Episcopal Hosp. Social Ser.	57	M.	M.	Carcinoma of larnyx.	6 treatments, 364 mg. hrs.	Negative.	
103	9/ 8/16	A. C.	Dr. Mitchell, Penna. Hospital.	28	F.	..	Squamous-cell carcinoma of cervix.	4 treatments, 880 mg. hrs.	.....	Did not return.
104	9/14/16	Z. B. B.	Dr. Jopson.	76	M.	..	Sarcoma of testicle.	8 treatments, 600 mg. hrs.	Negative.	
105	7/18/16	H. Z. B.	Dr. Henry Wharton.	..	M.	..	Rectal carcinoma.	2 treatments, 160 mg. hrs.	Negative.	Died.
106	7/16/16	H.	Dr. Hodge.	..	F.	S.	Epithelioma of face.	3 treatments, 1520 mg. hrs.	.....	Still under observation.
107	9/19/16	M. M.	Dr. Gibbon.	64	F.	..	Carcinoma of mouth.	.....	Negative.	
108	9/24/16	J. E.	Dr. Stauffer.	..	M.	M.	Sarcoma of nose.	4 treatments, 667 mg. hrs.	.....	Still under observation.
108a	9/26/16	D.	Dr. John Jopson.	72	F.	S.	Sarcoma of dura.	6 treatments, 2400 mg. hrs.	Died of apoplexy.	Tumor became smaller, hemorrhage less.
109	8/21/16	S.	Dr. DaCosta.	..	M	..	Carcinoma of face.	14 treatments, 1079 mg. hrs.	Negative.	
110	10/10/16	J. L. T.	Dr. Stryker.	82	F.	W.	Granuloma of roof of mouth.	8 treatments, 620 mg. hrs.	Improved.	Still under observation.
111	10/17/16	G. B.	Dr. Quicksell.	52	M.	M.	Carcimona of pharnyx.	8 treatments, 572 mg. hrs.		
111a	10/29/16	H. B.	Dr. E. J. Klopp.	..	M.	..	Carcinoma of throat.	4 treatments, 880 mg. hrs.	Negative.	
112	10/30/16	A. S.	Dr. C. D. Nassau.	85	M.	..	Rodent ulcer of right side of nose.	6 treatments, 440 mg. hrs.	.....	Under observation.
113	10/30/16	E. N.	Dr. Spiese.	24	F.	M.	Sarcoma of upper jaw.	5 treatments, 360 mg. hrs.	Much improved.	Under observation.
114	11/16/16	F. C.	Dr. W. A. Schatz, Polyclinic Hospital.	56	M.	S.	Carcinoma on pharynx.	.....	.....	Under treatment.
114a	11/17/16	U.	Dr. S. MacCuen Smith.	..	M.	..	Carcinoma of throat.			
114b	11/22/16	P. M. B.	Dr. Hugh Hanna.	..	F.	M.	Uterine carcinoma.	12 treatments, 960 mg hrs.	.....	Under treatment.
115	11/28/16	B. K. L.	Dr. E. E. Montgomery. Dr. John W. West.	50 50	F. F.	M. M.	Recurrent carcinoma of uterus.	3 treatments, 960 mg. hrs.	.....	Under treatment.
116	11/26/16	H. L.	Dr. Bird.	60	M.	..	Carcinoma of throat and pharynx.	4 treatments, 1760 mg. hrs.	.....	Under treatment.
117	12/13/16	E. H.	Dr. Masland.	45	M.	M.	T. B. of larynx.	5 treatments, 640 mg. hrs.	Died.	
118	12/26/16	R. K.	Dr. Dickman.	9 mo.	F.	S.	Angioma, cavernous, of face and forehead.	.....	.....	Under treatment.
119	12/27/16	J. H. M.	Dr. E. E. Montgomery.	66	M.	M.	Epithelioma of cheek.	.....	.....	Under treatment.
120	11/18/16	D. S.	.....	63	M.	..	Epithelioma of face.	.....	.....	Under treatment.

Many of these cases are of interest, while others call for no comment. Many were in a desperate condition, and treatment was given for relief of physical and mental suffering. Furthermore, no one is capable of passing judgment without a trial; for under some circumstances the most unpromising cases will be restored temporarily, while it must be acknowledged that, *per contra,* often the most promising will fail. The word "cured" for obvious reasons has not been used; "W. M. E. D." (without manifest evidence of disease) has been substituted.

UTERINE CARCINOMA.

One of the most interesting groups in this list is that of the patients suffering from inoperable carcinoma of the uterus.

Case 1.—M. L. K., referred by Dr. William Duffield Robinson, in March, 1913, had a complete hysterectomy performed and remained comfortable until April, 1914, when a slight bloody discharge was noted, which gradually became more profuse. This was accompanied by an increase of the discomfort. Examination when treatment began, December 2, 1914, showed an irregular indurated mass involving the upper and posterior portion of the vagina, and fixation of all pelvic structures. Manipulation was followed by profuse bleeding from the ulcerated surfaces, and a vaginal discharge existed, which was extremely foul and required frequent douches.

The treatment consisted of 20 mg. applied in a small tube surrounded by 1/10 mm. of lead foil wrapped in cotton and placed in a glass tube. Applications were made three times a week for six weeks, and then omitted for about the same time, when they were again continued for two months. On October 21, 1915, examination showed that the ulcer within the vagina had healed, but there still persisted a more or less thickened condition of the pelvic structures. The patient also complained of pain in the back.

In the light of similar cases a general radiation of the lower abdomen was adopted, which was followed by relief.

On December 4, 1916, there was a recurrence of the disease about the umbilicus, from which a mass protruded about the size of a horse chestnut, ulcerated upon the surface. The mass was first noticed about one month before. A small nodule also appeared above the clavicle on the left side and was about the size of an almond. During the previous two years the patient had been practically free from disease, free from pain, and free from discharge, and although thinner had been able to attend to her usual duties.

Case 10.—L. D., referred by Dr. Paterson, in June, 1914, noticed a bloody discharge, which gradually became worse, some pain and discomfort in the pelvis. Owing to the extension of the disease, and the size of the patient (weight 265 pounds), operation was impossible. On January 18, 1915, examination was difficult on account of fat. Although the patient had never borne children, there existed a well-marked rectocele. The uterus was greatly enlarged and appeared to be fixed posteriorly. Microscopical examination of tissue taken from within the uterus proved it to be an adenocarcinoma. The treatment consisted of applications of 22 mg. of radium (later reduced to 11 mg.) enclosed in a ½-mm. lead tube covered with celluloid, placed within the uterus and left for four to eight hours. A total of 26 treatments were given before April 17, 1915. During August and September, nine more seven-hour applications were given.

Pathological examinations from scrapings, examined by Dr. Ellis, of the Pathological Department, found, on January 30, 1915, and March 22, 1915, adenocarcinoma, and on May 1, 1915, and November 12, 1915, simply showed endometrium and blood clots. On October 3, 1916, the patient was still able to continue her work and had been free from discharge, but had some little discomfort in the pelvis.

By referring to the list, it will be seen that several others have likewise improved (Cases 4, 48, 60, 79, 90). It is of interest to observe the marked contraction of the remaining vaginal canal in those cases which recover. Attention has been previ-

CASE 21.—The edge of the tumor can be seen by a line extending from the inner canthus of the right eye down and over the bridge of the nose. The small discolored portion upon the bridge of the nose is about one-quarter the size.

CASE 21.—After treatment. Note pigmentation beyond edges of the growth.

CASE 33.—Nevus before treatment.

CASE 33.—Nevus after treatment. Still under treatment.

ously called to this, in a report of 50 cases made in the *New York Medical Journal* for July, 1915. Some authorities have stated that only large amounts of radium should be used in the treatment of these cases. In the number that have come under my observation it would appear that small, frequent doses continued over several months, followed by radiation of the whole lower abdomen, will give better results than the use of large amounts of radium locally over a short space of time.

CARCINOMAS ELSEWHERE.

Carcinoma of other parts of more than common interest are: An advanced rectal case (No. 18) and two prostatic cases (Nos. 8, 74a). The difficulty of applying and directing the radiation so as to do no harm to the surrounding structures was at

CASE 38.—Angioma of scalp before treatment.

CASE 38.—Angioma of scalp after treatment.

CASE 47.—Hairy mole of cheek. After treatment. Note pigmented area beyond the area treated. No picture taken before treatment.

times a harassing problem. In a laryngeal case (No. 15) attempts were made to treat the growth from within. This was finally abandoned, and the "cross-fire" method was adopted. Case 60a, carcinoma of the urethra, was unable to void urine, and only the smallest catheter would enter the bladder. Details of this case have been reported by Dr. Shoemaker in *Surgery, Gynecology and Obstetrics* for June, 1916.

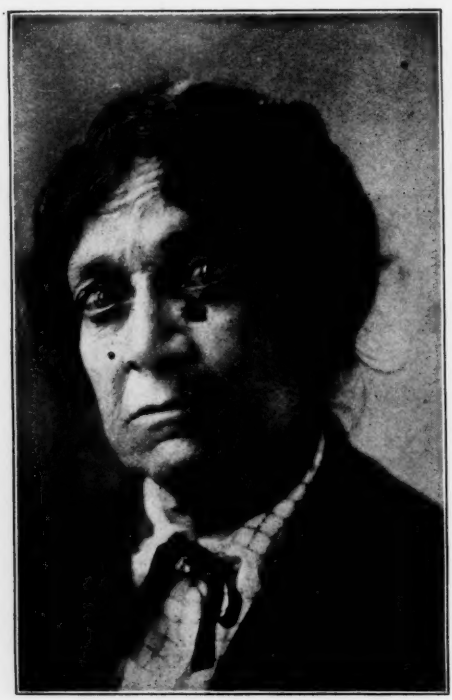
FIBROIDS.

Five cases of uterine fibroids were treated with good results (Cases 8, 12, 41, 42, 56). In all, bleeding was profuse and operation was impossible for various reasons. Treatment was followed by a cessation of hemorrhages, while the masses contracted to small nodules. Case 56 was complicated with carcinoma of the left breast and with bone metastasis. The bleeding from the fibroid was checked and the mass was decidedly reduced.

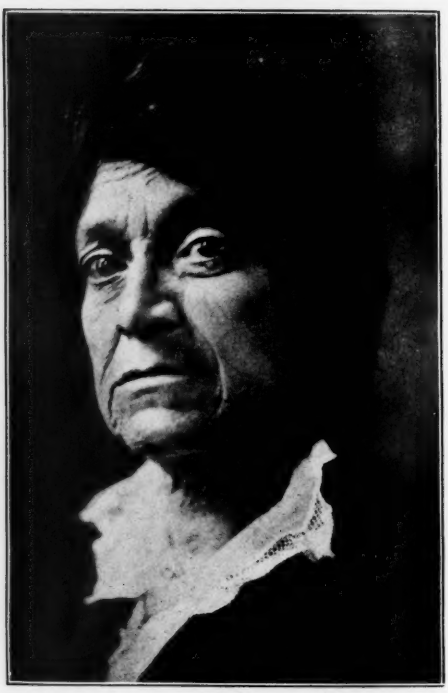
Case 8 was complicated by chronic nephritis. While the mass extended well above the pelvic brim, it was firmly wedged in the true pelvis and gave a great deal of discomfort. Treatments were given in the usual manner, and while there was little evidence of local reaction the urine became loaded with albumin, heart was irregular and weak, limbs were swollen, and all the symptoms of cardiac and renal insufficiency were present. These alarming symptoms lasted for about one month, when they gradually subsided. During this time the mass had greatly decreased and the menses ceased entirely. It is difficult to state in this case if this acute condition was due to the absorption of material from the fibroid

CASE 50.—Hairy mole. Before treatment.

CASE 50.—After treatment. Mass over eye is due to the thickened bone.



CASE 78.—Epithelioma before treatment.



CASE 78.—Epithelioma. Six months later.

undergoing retrograde change, or if it was purely accidental, due to the nephritic condition.

SARCOMAS.

A number of sarcomas of severe types were treated, and while it was possible in some instances to control the local condition, metastases followed in such rapid succession at most unexpected places that it was not possible to anticipate the location. This is contrary to the usual experience in these cases, and in this list the beneficial results have been entirely upon the carcinoma side.

SUPERFICIAL EPITHELIOMAS.

A number of cases of superficial epithelioma upon the face and within the mouth were treated and yielded promptly, giving very good sound scars with very little disfigurement. Some of them had been treated by other methods, even the Roentgen ray. Radium is particularly useful in cases about the eye, or about the ear, in the folds, where it is difficult to direct the Roentgen ray without doing harm to surrounding structures; even within the nose or mouth it can be applied easily.

Cases 23, 34, 35, 54, 73, and 78 exemplify the nature of these external conditions. No. 73 came under observation in the spring of 1909, and was treated with radium at that time. Several small recurrences have taken place since, which have been promptly relieved by the use of radium, while the case has all the appearances of a "rodent ulcer." The disease extends deep into the left naris (see *Jour. A. M. A.*, Aug. 29, 1914).

Case 78 is also of interest, as it had been unsuccessfully treated with the Roentgen rays. Small epitheliomas within the oral cavity in the great majority of instances yield to the influence of radium. If, however, the disease has involved the deeper structures, it is very likely that the glands in the neck have also become invaded, and the case is usually hopeless. However, a number of cases have come under observation in which the glands in the neck have become enlarged and have subsided after the ulcer healed. In these instances the enlargement was due to pus (see Cases 7, 20).

ANGIOMAS, MOLES, AND NEVI.

A number of these cases have been treated with exceptionally good results, and while several of the more extensive are still under observation, the time required is fully justified by the result. Where the mass is localized and can be covered by one or two applications the process is easy, but where the mass is extensive, over an irregular surface with varying thicknesses of fibrous tissue as well as the blood-vessels, removal is often quite difficult. This is well illustrated in Case 50, in which the left forehead was covered with a very thick growth of hair upon a base of heavy tawny-brown skin. After the hair had been removed and the color bleached, the underlying structure was found to be a hard bony mass. Another case similar to this was No. 47. Here, however, the growth of hair was upon the cheek, and the underlying mass was softer. A very gratifying result was obtained. Case 21, a cavernous nevus, and Cases 11 and 38 gave results equally as good. A complete report of these cases will be found in the *American Journal of Roentgenology*, January, 1917.

UNCLASSIFIED CASES.

Three cases in this list proved to be specific in origin, and when placed upon proper treatment responded as would naturally be expected. This point is merely mentioned, as they had all been under the observation of several of our best-known clinicians. No. 69 suffered from an unusual condition—cheilitis. The lower lip was swollen and the inflammatory condition reached well down upon the inner side. A fair degree of reaction was produced from the radium, and when it subsided the mucous membrane was apparently perfectly healthy.

No. 17, a case of splenomegaly, showed remarkable improvement while under treatment. This case has suffered several relapses. The interesting changes in the blood have been fully reported by Dr. Joseph Sailer before the College of American Physicians, 1916.

TECHNIQUE.

About two years ago, when the department was established, it possessed a little over 20 milligrammes of radium; since that time it has gradually increased its supply until the amount at the present time slightly exceeds 200 milligrammes. Necessarily the technique has also been modified. Only a general outline can be given at this time.

Where deep radiation was desired the radium tube was surrounded with thin sheets of lead varying in thickness from

1/10 to 2 millimeters, the scattering rays were guarded by lead several times thicker than that used for the filter, and all metal was then guarded from secondary radiation by several layers of gauze or paper. If possible the radium was not applied to the same place a second time.

If the surface was moist, or if deep radiation was needed within a cavity, sheet rubber was employed for the last cover, or frequently celluloid or glass tubes were used. The same general principles were adopted regarding the protecting lead shields and filters.

Upon the surface where a uniform radiation was needed the tubes were placed at a certain distance from the desired spot, so that all rays would strike with uniform intensity. In cases of nevi a small pill-box was employed and three small tubes placed upon the top at equal distance apart, so that the space between the top and bottom of the box would be equal to the space between the tubes. Filters of varying degree were interposed. In other surface cases in which deep radiation was desired the general rules previously given were adopted.

Measurements of radiation were made by the milligramme-hour, always considering the intervening air space and filters.

As a rule frequent, short applications were used, as apparently the after-reaction can be better controlled. However, in cases living at a distance the usual massive dose was employed.

In conclusion, attention is called to the very wide difference in the cases contained within this list, and careful analysis will show that in those to whom radium gave relief and comfort it could not have been accomplished by any other known means. Therefore, one feels justified in the time given to this class of sufferers.

THE DIFFERENTIATION OF ABDOMINAL PAIN AND ITS BEARING ON TREATMENT.[1]

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Pain has wisely been termed the guardian of health; the cry of nature for assistance; a blessing in disguise for which we should be, but are not always, grateful, for no one "has as yet learned to love its rod." Its refining and ennobling influence on the disposition and character of erring mankind has been the theme of poet and novelist in all ages. Its significance to the internist and to the surgeon is self-evident, and I should have hesitated to adopt it for the subject of this evening's talk were it not that its language is oftentimes obscure and frequently misunderstood, and that what I have gained from a wide and varied experience might be of some use in reading aright some of its less clear indications, especially with reference to its location in the abdomen.

That there is a cause for every pain is a trite axiom, and our object should be not merely to relieve the pain but to remove the cause. Like many physical manifestations there is a psychological element in pain, so that it is difficult to estimate its severity. We cannot always rely on what our patients tell us as to its intensity or otherwise; what is excruciating to one may be passed off lightly by another. It is here that experience and that indefinable gift—intuition—are of so much value. Lacking these it is important that the clinician should disregard no complaint of pain. The subjective pains of the neurotic individual are not rarely found to be due to some pathological condition of the nervous system, while the more common objective pain is a distinct indication of tissue injury which dare not be ignored.

One of the greatest difficulties in the correct interpretation of pain is that the sensation is often reflected to regions

[1]Read before the Baltimore City Medical Society, Baltimore, Maryland, February 16, 1917.

remote from the actual site of the lesion causing it. This is perhaps better illustrated by pain in the abdomen, and also in the chest, than elsewhere in the body economy. It is a well-known fact that the abdominal organs are almost insensitive to pain, and that it is the exquisite sensitiveness of the abdominal wall that accounts for the prominence of pain in the symptom-complex of visceral disease. In other words, the stimulation of the nerve centers gives rise to pain which is referred to the peripheral distribution of these nerves in the body wall. Ordinarily we are not conscious of visceral functions. Peristalsis takes place and we know it not, but when for some reason or other it becomes violent, we are conscious of it in the form of pain, presumably due to disturbance of associated nerve tracts of the parietes.

Abdominal pain is due to intrinsic and extrinsic causes. Not a few failures of diagnosis in supposed abdominal disease are due to lack of consideration of the extrinsic causes of abdominal pain. We should never forget the law that any irritation of a sensory nerve is referred to its end organ. This makes clear the abdominal pains which are due to lesions of the spinal cord, or to diseases of the spine which affect the efferent nerves, such as caries, tumors, and arthritis deformans; also certain types of neuritis in the abdominal nerve distribution. In certain neurological cases abdominal pain may even be of central origin, explainable only by the hazy and dangerous mysticism of functional cerebral disorders.

Still other varieties of extrinsic abdominal pains are of the reflected variety, such as the epigastric crises of angina pectoris and the abdominal pains of basal pleurisy. These and other obscure conditions may present difficulties of diagnosis that are well-nigh insuperable and require the greatest amount of care in combining the results of the history and the examination.

The most familiar example of abdominal pain in which some spinal cord lesion is the underlying cause is the gastric pain of tabes. The differentiation is not difficult, since the gastric crises usually occur in the stage of the disorder when the symptoms are already sufficiently pronounced to enable a correct interpretation of the origin of the gastric symptoms. The most common cause for mistaking this condition for an intra-abdominal catastrophe is the failure to think of it. That the error is not uncommon, however, is shown by the series of cases of tabes reported by Nuzam from the Cook County Hospital, Chicago, in which he showed that approximately ten per cent of about 1000 cases had been subjected to abdominal operation for gastric or duodenal ulcer, gall-bladder disease, appendicitis, or other supposed lesions of the abdominal viscera. An example of pain referred to the lower right abdominal quadrant is that caused by acute epiphysitis of the upper end of the right femur; acute coxalgia of the right side; acute osteomyelitis of the right great trochanter can be the cause of pain being referred to the above region.

Fortunately nature has not drawn too many barriers across our trail, and in the vast majority of cases of abdominal pain the exciting cause is to be found in demonstrable disease of one or other of the occupants of the abdominal cavity. One must not too readily conclude that pain in the abdomen is of referred or reflected nature. It is possible for the tabetic to have abdominal disease, and I have operated upon the insane for appendicitis neglected until an abscess mass made the condition unmistakable.

That abdominal pain may be due also to a local manifestation of a general condition not amenable to surgical treatment is also true. The visceral crises of angioneurotic edema or purpura so well portrayed by Osler are examples, fortunately rare, of this type.

In general, therefore, while we may say that the alert clinician will keep a corner of his eye open for this extrinsic cause of abdominal pain, he will do well to center his full gaze upon the contents of the abdomen when pain dwells therein.

In general, abdominal pain is due chiefly to derangements of function resulting in tension, or to inflammation, or to both. The severe and rhythmic character of spasm or

contraction of a hollow viscus is due to obstruction and represents the excess activity of the organ to break down the obstruction and the relaxation caused by fatigue resulting from the effort. We see this in its pure form most often in calculous disease of the genito-urinary and the biliary tract. Typically the pain in renal colic begins in the lumbar region and radiates forward and downward over the lower abdomen, and is referred to the genital organs. But how often do we see departures from the typical in the location, severity, and radiation of pain. The presence of stone in the right ureter in some of these cases not infrequently produces symptoms of appendicitis, a fact which should be borne in mind in the diagnosis of appendicitis. Ureteritis, stricture of the ureter, and pyelitis have been mistaken for appendicitis and the patient operated for the wrong thing; one of the watchwords is, always examine the urine. Typical gallstone colic, with its pain in the right abdomen referred to the right shoulder and back, is familiar to all of us, but very often the pain is entirely located in the epigastrium, and it is then difficult to distinguish it from other diseases of the upper abdomen. In order to make the distinction it is necessary to be familiar with the clinical picture presented by other intra-abdominal affections, which we shall discuss presently.

Intestinal colic is another type of obstructive abdominal pain. This is too often attributed to some dietetic error, the most favorite diagnosis being ptomaine poisoning. The latter is in reality a rare condition, and, except in cases actually due to some tainted food, intense pain with vomiting and sweats and collapse will usually be found to be due to other causes, such as perforated viscus, pancreatitis, extrauterine pregnancy, abortion, or some septic condition of the abdomen. Severe intestinal colic is at times due to the presence of fecal masses, the removal of which soon relieves the condition.

Again, it may be due to the irritating effect of abnormal contents, causing inflammation and hyperperistalsis with resulting colicky pain. The most important decision to be made by the physician when confronted with the diagnosis of colic is to eliminate organic obstruction. Regularly recurring cramps are significant of true obstruction. Hyperperistalsis from other causes rarely shows the regularity, the persistence, and the similarity of location that are characteristic of organic obstruction. Irregular intermittency of pain, with shifting position corresponding to the segment of the intestine which is undergoing the violent vermicular contraction, is indicative of enteritis. As a rule obstructive pain is more severe than that of enteritis, though the latter may on occasion be equally severe. Naturally other symptoms, together with the history and the physical examination, enter largely into a diagnosis, but to-night I must merely point out that a painstaking development of the various characteristics of the pain in these various conditions is of greater value than is ordinarily appreciated, and, especially in doubtful cases, may be decisive.

There is one variety of colic about which we formerly heard much but fortunately nowadays but little is said. I refer to appendicular colic. I am willing to admit what is perfectly true, that the appendix suffers frequently from obstruction by concretions, strictures, kinks, torsions, and inflammatory swellings. That it occurs independently of inflammation of the appendix I am very skeptical. Appendicular colic is always appendicitis, and it is a mistake to label it otherwise. If obstruction is the primary feature, at any rate inflammation treads upon its heels and in the vast majority of cases soon rules the scene. Appendicular colic, on the other hand, is a frequent result of appendicular inflammation. In this particular segment of the intestinal tract it is a mistake, therefore, to attempt to differentiate inflammation from obstruction. They are one and inseparable in the majority of cases, and the indications are the same.

As a general rule all agonizing abdominal pains belong to the surgeon. I trust my friends the internists (who would better be called externists, as they do all their

work on the outside) will not think I am unduly grasping in making this assertion. We have fortunately outlived the age of sensory neuroses—"algias" and other diagnoses, which were names only. We are approaching the time when the surgeon will be called in every case of severe abdominal pain. To the excruciating group of abdominal diseases belong acute pancreatitis, mesenteric and mesocolic thrombosis, the stone colics, perforations of the gastrointestinal tract, extrauterine pregnancy, and twisted pedicles, all surgical conditions, and all conditions that may and often do call for prompt action to avert fatality. In striving for efficiency we should endeavor to cut down the latent period of diagnosis before treatment. The watchful waiting policy while pathology is making its onslaught cannot be other than disastrous. This can best be done by the promptest coöperation of the surgeon with the family physician.

One of the most common severe seizures of this group is without doubt that due to perforation of a gastric or duodenal ulcer. The pain is stab-like, intense, and is referred to the upper abdomen, which soon assumes the characteristic board-like rigidity. Very often in these cases infection extending downward toward the right iliac fossa causes extreme tendereness in the appendiceal region and suggests acute perforating appendicitis and peritonitis—a diagnostic error of almost banal frequency and one which is not always avoidable even with a most carefully taken history. The operative mortality in perforating duodenal ulcer in my experience is almost negligible—one death in 46 operations up to date. I do not hesitate to give all credit for this happy result to the prompt action on the part of an intelligent clientele of physicians.

The average case of acute appendicitis is readily recognized by most physicians, beginning, as it generally does, in the periumbilical region and soon localizing in the right iliac fossa. Yet the pain of this disease, both subjective and as elicited by examination, presents the most marked variations. Much depends upon the length of the appendix and the situation of its inflamed portion. For the sake of making an impression upon students I often say that if an appendix were to pass out of the abdominal cavity by way of either sacrosciatic foramen and continue its course through the popliteal space to the os calcis, and that person were to have appendicitis, he would have pain referred to his heel. Similarly a common cause of pelvic pain and left-sided tenderness is the pelvic appendix.

In many instances the seat of any lesion causing abdominal pain cannot be correctly surmised from the unaided description of the patient. In such cases we resort to the ordinary means of producing pain in the suspected location by pressure. A most useful expedient which I can recommend is to have the patient cough. In the presence of an acutely inflamed focus within the abdomen the impulse imparted to it by the sudden descent of the diaphragm will often point out to the patient and to the surgeon the exact location of the sore spot. This is particularly valuable in locating a diseased appendix before the early central pain has localized in the right iliac fossa. *Per contra*, it is true pain in the right iliac fossa in the female is oftentimes referable to some acute condition of the right ovary and of the Fallopian tubes. This is largely a matter of the position of the affected organ.

The pyloric orifice, the duodenum, the gall-bladder and biliary ducts, the head of the pancreas, and the hilum of the right kidney are all found within a very small area which can be covered by the palm of the hand upon the anterior abdominal wall, and the appendix is not distant. It is small wonder that these organs, accustomed as they are in a state of health to localization of sensations, should, when diseased, fail to speak an unmistakable language.

The pain of chronic gastric and duodenal ulcer, the most frequent site of which is near the pylorus, is epigastric and is sufficiently marked by its gnawing character, its periodicity, and its relation to food intake, to make it unmistakable in typical instances. Gall-bladder disease causes pain in the right hypochondrium, radiating to the right. Involvement of the pancreas

produces a low or central pain. The onset of pain in chronic appendicitis may suggest a lesion of almost any of the intra-abdominal organs mentioned, but it generally localizes in the appendiceal region, and the accompanying tenderness and rigidity of this region help to indicate the true nature of the trouble in the greater number of cases.

Intra-abdominal adhesions are often a convenient diagnosis with which to impress a patient whose abdominal pain does not suggest any definite lesion. I have elsewhere sounded a warning note, which I here repeat, against dangerous and difficult operations which have come into vogue for the relief of such supposed conditions, congenital or acquired. There is no doubt that pain of every degree may be caused by adhesions, but I again put the question, What is the normal arrangement of the abdominal viscera for a given individual? In reality we do not know, for people's viscera vary as much as does their physiognomy, though "in the image of God He created them all."

Pain of itself is not a clinical entity, and it is too often upon associated signs, such as local tenderness (referred pain never produces a tenderness at the referred area), spasm, vomiting, fever, chills, etc., and also on the history of the illness, that we must to a great extent rely in making our diagnosis, and finally on that sixth sense with which a favored few are endowed—intuition. The advances in abdominal surgery have contributed much to our knowledge of the immediate as well as the remote causes of pain. The early exploration has been responsible for bringing to the light of day the previously obscure causes of many varieties of abdominal pain.

Postoperative pain, real or fancied, has been one of the great bars to the general dissemination of many of the benefits of surgery. To avoid pain many have chanced the most horrible of deaths and lost. Our greatest regret is the painless nature of malignant disease in its incipiency. But we must reckon with human nature and minimize to every degree consistent with safety the sufferings incident to surgery. In so doing I want to sound a warning note against the practice of narcotizing abdominal patients which has obtained recently in certain high quarters, what I cannot refrain from calling pseudo-scientific support. I have passed through that struggle once and am now satisfied. If I want to know just where my patients are on the journey to recovery I do not want them drugged to stupefaction. I do not want to put their primitive vegetative functions at a disadvantage to pander to a weakness of the flesh. Morphia is truly God's own medicine, but only when used rightly and with discretion. The pains that occur after operation are in some instances like unto those that occur before operation, a warning. Even with the signal it may be difficult enough to sight the danger. Without it the patient may be upon the rocks and the surgeon taken unawares. The differentiation of abdominal pain occurring on the second or third day, or later, after operation is oftentimes puzzling. The pain of distention and obstruction is usually colicky and spasmodic, showing a definite relationship to peristalsis; there is generally neither tenderness nor rigidity; the degree of severity of the pain indicating whether it is being caused by distention or by obstruction. Postoperative peritonitis, on the other hand, produces muscular rigidity and tenderness, peristalsis is absent, the pain is constant and unremitting, the latter being, perhaps, the most marked distinction between peritonitis and postoperative pain of mechanical obstruction and distention.

We have thus far considered only the positive character of abdominal pain. There is also a negative side to the question—that is, the absence of pain when it normally should be present. As in peritonitis it is that ominous silence of the belly wall that causes such mental distress to the surgeon, so also the sudden cessation of abdominal pain with or without the usual accompanying indications of improvement—reduced temperature and reduction in the leucocyte count—portends a serious and grave state of affairs, indicating a ruptured or gangrenous appendix or perforation of an abscess into the peritoneal cavity, a con-

dition not readily understood or recognized by the occasional operator or the tyro in surgery.

It is perhaps not out of place to say a word about painless abdominal conditions. I have on a number of occasions removed an intensely inflamed appendix as an incidental procedure during some abdominal operation, the patient being absolutely free from any pain referable to the condition prior to operation. Gastric and duodenal ulcers may exist for months and perhaps for years without any pain, or at least a minimal and trifling amount. Infection lurks at times in the gall-bladder from childhood to old age and only occasionally does suffering result therefrom. Yet these and other foci may serve as the laboratory in which toxins are manufactured and distributed to the body. They may be the portal of entry of many an obscure infection, and at bottom they may be responsible for a vast number of organic changes that masquerade under other names and are attributed to other causes. The degree of pain is not the index of treatment. It should be the aim of all of us to eradicate, not to palliate, disease. The recent extensions of the significance of infection we have no time to develop here, but we may note that pain does not always serve to point that which should be done. Yet pain is a faithful ally of both physician and surgeon, and thus we come back to extolling its beneficent character. It is not a thing to be denied, a devil to be exorcised, but one of God's great gifts, worthy of our study, our admiration, and our praise.

HOME-MADE BREAD SUBSTITUTES FOR DIABETIC PATIENTS.

In the *British Medical Journal* of December 23, 1916, WILLIAMSON states that in England they have a number of diabetic breads which, chemically, are quite satisfactory, and to many patients palatable. But other patients find that many of them are unpalatable, and the cost has always been an objection with poor patients; this objection is greater now, as the war has increased the cost of most diabetic breads very considerably. The following directions for home-made bread substitutes may therefore be of some service.

Williamson has used the first two bread substitutes for three years in the treatment of his patients at the Manchester Royal Infirmary, and has found them very satisfactory and cheaper than diabetic breads. Before the war the cost of these bread substitutes was only about half the cost of the best diabetic breads, but owing to the great increase in the price of food it is now difficult to make a satisfactory comparison of the exact cost.

In his own house he has no difficulty in preparing these cakes. In the kitchen at the Manchester Royal Infirmary difficulties were reported, but these were finally overcome, and for three years satisfactory cakes (1 and 2) were prepared for his patients at that hospital.

Many patients find these cakes more palatable than diabetic bread; some find them quite as palatable; whilst others find them less palatable than many pure diabetic breads.

1. *Biogene and Gluten Cakes.*

Biogene, 3 tablespoonfuls.
Satisfactory gluten, 2 tablespoonfuls.
Baking powder, half a teaspoonful.
One egg well beaten up.
A small pinch of salt.

Mix well together, adding the baking powder last (just before baking). A little water may be added, if necessary. Drop into six tins, and bake for twenty minutes.

2. *Biogene and Cocoanut Cakes.*

Mix a quarter of an ounce of yeast with four tablespoonfuls of lukewarm water. Add one and a half tablespoonfuls of desiccated cocoanut powder. Mix well. Cover and leave to ferment in a warm place (not hot) for one hour. Then beat up one egg with a little warm water; add this and six tablespoonfuls of biogene to the above. All should be well mixed into a stiff paste. Place in six small pattie tins. Bake in a moderate oven twenty or twenty-five minutes. When taken out of the oven allow the cakes to stand for ten minutes, and then slip them out of the tins with a knife, and allow them to dry. The tins should not be greased.

3. *Gluten and Cocoanut Cakes.*

Mix a quarter of an ounce of yeast with four tablespoonfuls of lukewarm water. Add one and a half tablespoonfuls of desiccated cocoanut powder. Mix well. Cover and leave to ferment in a warm place (not hot) for one hour. Then

beat up one egg with a little warm water; add this and three tablespoonfuls of gluten to the above. All should be well mixed into a stiff paste. Place in six small pattie tins. Bake in a moderate oven twenty or twenty-five minutes. When taken out of the oven, allow the cakes to stand for ten minutes and then slip them out of the tins with a knife, and allow them to dry. The tins should not be greased. These cakes should be toasted and buttered and not eaten cold.

4. *Cocoanut, Casein, and Gluten Cakes.*

Desiccated cocoanut powder, 2½ ounces.
Casein, 2 ounces.
Biogene, half an ounce.
Gluten flour, 1 ounce.
Two eggs.

Place the cocoanut powder in a dish; mix it with a quarter of an ounce of German yeast; cover it with water and mix well. Leave the mixture in a warm place (not hot) for one hour. Then add the casein, biogene and gluten flour, two eggs (beaten up), and a small pinch of salt; mix well and drop into six small tins. Bake for twenty-five minutes. These cakes only contain a very small amount of starch; to many patients they are quite palatable, and before the war the cost was small.

5. *Cocoanut Cakes.*

Half an ounce of German yeast.
Two tablespoonfuls of lukewarm water.
Eight ounces of desiccated cocoanut powder.

Mix into a paste, adding a little more lukewarm water if necessary. Leave in warm place for one hour. Then add one egg (beaten up in two tablespoonfuls of milk) and a little salt. Mix well. Place in eight small dishes or tins (well greased). Bake in a moderate oven twenty or thirty minutes. These are the cheapest diabetic cakes.

6. *Almond Cakes.*

These can be made in a similar manner; almond flour being used in place of cocoanut powder.

Cakes 2, 5, and 6 are free from starch, and should be practically free from sugar if prepared satisfactorily. Cakes 1, 3, and 4 contain a very small percentage of starch, as the gluten flour used contains 5 or 6 per cent of starch.

If the patient is unable to eat these cakes, or unable to have them prepared satisfactorily, or if they are too expensive and the pure diabetic bread also too expensive, then it is better that he should take a small amount of ordinary white bread, three ounces daily, rather than take cheap, impure diabetic bread in indefinite quantities. It is always desirable that all diabetic breads should be tested roughly by the medical man before they are advised to patients. This may be done by dropping a little of the following solution on to the cut surfaces of the diabetic bread:

Iodine, 1 grain.
Potassium iodide, 1 grain.
Water, ½ ounce.

A deep blue-black coloration is produced if the bread contains much starch.

This simple test is sufficient to show that a large number of the very palatable cheap diabetic breads are loaded with starch, and therefore unreliable. A number of the reliable bread substitutes should be tried, and the patient should continue to take the most palatable of these reliable preparations. But the patient should be allowed to try only reliable diabetic breads—that is, those which the medical man has found from his own testing to be satisfactory.

Williamson thinks that most patients will find one or more palatable cakes amongst the six for which directions for preparation have been given in this note, and the cost will be considerably less than that of diabetic breads. The cheapest are the cocoanut cakes, and the combined cocoanut, casein, and gluten cakes. All are satisfactory chemically, if carefully prepared. Probably most patients will find the biogene and gluten cakes or the combined cocoanut, casein, and gluten cakes the most palatable.

SHALL WE TREAT THE PARETIC?

In the *Journal of the American Medical Association* of January 20, 1917, RIGGS and HAMMES reach these conclusions:

1. Both clinically and biologically it has been demonstrated that treatment is a material benefit to the paretic.

2. Before the salvarsan era the number of remissions varied from four to twenty per cent. Since its use and the employment of modern forms of therapy, they have been greatly increased in frequency.

3. Treatment, to be effective in paresis, must be given in its earliest stages; in cases of long standing it is useless; cell destruction cannot be replaced. Also, to be effective, it must be persistent. It may be a matter of many months before the activity of the infection can be influenced.

EDITORIAL.

SHOCK AND VASCULAR COLLAPSE.

More than thirty years ago Dr. H. C. Wood, at one time Editor of the THERAPEUTIC GAZETTE, impressed upon his students, when teaching therapeutics, that a dominant condition in that state which is commonly called "shock" depended upon profound vascular relaxation; and in the first edition of his book upon Therapeutics, which the present Editor of the GAZETTE wrote nearly thirty years ago, he also emphasized this point. About fifteen years ago certain investigations by surgeons, rather than by physicians, served to greatly increase the interest of the profession in this important matter, and since that time a large number of researches have been carried out. Although some of these have been thought to indicate that other factors are important in shock, the conclusions reached have practically been identical with those which were emphasized during the earlier time of which we speak.

One of the most efficient supporters of the theory that shock consists largely in vascular relaxation has been Porter, whose experiments upon animals have certainly confirmed the observations of earlier investigators.

In the *Boston Medical and Surgical Journal* Porter has recently contributed an interesting article upon "Shock in War" as a result of observations made by him in France during the present great conflict. Briefly stated these observations, made close to the firing line, upon soldiers recently and severely wounded, confirm his investigations upon animals and indicate clearly that measures directed toward the restoration and maintenance of an approximately normal blood-pressure are absolutely essential.

Porter states that from a practical standpoint shock exists when the diastolic pressure is 60 millimeters or less, as the blood then accumulates in the portal veins, the activity of the heart is impaired, and the nutrition of the nerve cells is affected. He recommends that a patient suffering from shock should be put with the head below the heels so that the abdominal vessels will be higher than the heart and brain; that artificial heat shall be applied and intravenous injections of normal saline administered, to which adrenalin should be added when needed. In some instances transfusion of blood seems to be necessary.

That the exact condition of the patient may be determined and further treatment decided upon he recommends the taking of the diastolic pressure every half-hour. He does not wait until the diastolic pressure is as low as 60, but if it is below 80 advises that normal saline solution shall be injected into the vein to the extent of about 500 Cc. It would seem that this is beginning treatment rather early, since many perfectly healthy men have a diastolic pressure of 80 and this pressure can be considered normal. He adds that if after an injection of saline solution the pressure does not rise it is essential that adrenalin be given in the next injection, and points out that the adrenalin in solution of 1:1000 should be kept in a stoppered flask in the dark, and that solutions which are not colorless should be rejected. At the moment of injection 0.5 Cc. of adrenalin solution in 50 Cc. of normal saline solution at 38° C. should be used. The injection should be given slowly and should be stopped if the heart becomes irregular in its action.

It is interesting to note that the practical application of these advices seems to have produced excellent results amongst French soldiers who have been wounded.

One other factor we are surprised to find is not considered, namely, the administration of atropine, which undoubtedly tends to contract the blood-vessels in the splanchnic area and restore circulatory equilibrium. Atropine has been shown by the writer, and many others, to be an efficient protective agent against shock and vascular collapse arising from the use of chloroform. If used by hypodermic needle in a case of shock it must be given deeply into the belly

or a muscle, or in a very dilute solution intravenously, since in vascular collapse there is no absorption from the subcutaneous tissues. As atropine, although an active drug, almost never produces lethal poisoning, there is no danger in its use and it should be employed fearlessly, as much as 1/75 or even 1/50 of a grain or more in severe cases.

PHOSPHATE RETENTION AND ACIDOSIS.

We have, on a number of occasions during the last two years, taken pains to inform our readers of some of the more recent investigations which have been made upon the important subject of acidosis. It is not many years since this state was almost unknown to the profession, and what little we knew of it dealt with the so-called acidosis of diabetes in its more advanced forms. Some time ago we called attention to the fact, known already to many others, not only that all conditions which induce starvation are prone to result in acidosis, but that this condition may be the chief cause for the stupor and the death of children suffering from acute or subacute gastrointestinal disorders, notably infantile diarrhea.

It is becoming increasingly evident that there are other forms of acidosis than that which is typical in diabetes mellitus, and which is dependent upon the presence of beta-oxybutyric acid or diacetic acid. This evidence is based upon the fact that methods employed for the relief of the well-recognized forms of acidosis fail in certain patients and upon various laboratory investigations which indicate that all acidosis is not due to beta-oxybutyric acid or its educts. In nephritis, when the disease is far advanced, a large part of the dyspnea from which the patient suffers is probably due to a form of acidosis, and an examination of these patients will show, as has been recently pointed out by Marriott and Howland, a diminished carbon dioxide tension of the alveolar air, an increased hydrogen ion concentration of the blood or serum, a diminution of the alkali reserve, and of the ability of the hemoglobin to combine with oxygen.

Marriott and Howland think that a reasonable explanation for the acidosis is that the kidneys fail to play their part in excreting the acid substances ordinarily formed, for healthy kidneys maintain the acid basis equilibrium of the body by their ability to excrete phosphates. Marriott has therefore devised a method whereby he believes he is able to accurately and delicately determine the inorganic phosphates in a small quantity of serum. The results seem to indicate that inorganic phosphates, as expressed in terms of phosphorus, should be normally from 1 to 3.5 mg. per 100 Cc. of blood, the great majority of patients presenting a quantity less than 2 mg. In severe cases of nephritis there is a tendency of the inorganic phosphates to be slightly increased, but they admit that in some instances death from nephritis occurred without increase in the phosphates and without any increase of acidosis. In those nephritic patients, however, who presented evidences of acidosis, manifested chiefly by dyspnea, there was in every instance an increase in the inorganic phosphates, as indicated in terms of phosphorus often varying from 8 to 23 mg. per 100 Cc. of blood, and they believe that the retention of acid phosphate is responsible for the symptoms in these cases, although they are not confident that it is the sole factor. Such a retention of acid phosphate is not necessarily a part of general salt retention on the part of the kidney, but is apparently due to the fact that the particular function of the kidney which is concerned with the elimination of acid phosphate is impaired.

While it is true that this acidosis may be temporarily combated or overcome by the free administration of alkalies, it is also unfortunately true that the symptoms are not materially modified, and the use of bicarbonate of sodium fails to bring about the desired reduction of the accumulated phosphate. Marriott and Howland also think that the retention of acid phosphate has a definite influence upon osmotic pres-

sure, and that this may be a factor in the development of edema. As yet they are unable to advance any method which will successfully combat this acidosis so far as acid phosphate is concerned except by indirect means. Most of the cases which they investigated, while showing on the one hand a greatly increased quantity of acid phosphate in the blood, showed that the calcium of the blood had been greatly reduced, being only about one-tenth of the normal quantity. For this reason they think that the administration of calcium salt may lead to increased elimination of phosphate and replace some of the calcium which the blood lacks.

THE DUCTLESS GLANDS.

The constantly accumulating evidence which indicates that the ductless glands are closely interlocking in their function increases rather than diminishes the intense interest which we feel in this comparatively new field of physiology and clinical medicine. It would seem that there still remain functions and glands to be more thoroughly investigated which in their investigation will throw a flood of light upon many functions of the body which heretofore have been but little understood.

All too frequently the laboratory investigator falls into the habit of considering his results as belonging to the realm of abstract science and cares little for the practical application of the results which he achieves. A notable exception to this is found in the work and contributions of Cannon of Boston, who is broad enough in his view to see that the real interest in such investigations is due to the light which they may pour upon the study of human beings in various conditions of disease. In a recent issue of the *Journal of the American Medical Association* he reiterates, what he has so clearly stated before, that when there is great excitement the suprarenal glands secrete adrenalin which in turn acts as a key which liberates sugar from the liver, resulting in an increased quantity of this substance in the blood, and from this increased quantity the muscles, which are utilized in the escape of the individual, animal or man, from danger, are provided with a flood of nutritional material. Furthermore, the excess in the secretion of adrenalin results in a redistribution of the blood, so that it leaves the digestive apparatus, whose functions are temporarily inhibited, and is largely confined in its circulation to the heart, the lungs, the central nervous system, and the muscles. At the same time it dilates the bronchioles and increases the number of red blood cells and thereby permits air to enter the vesicles of the lungs more readily and enables the blood to carry oxygen in greater quantity.

Many of these investigations seem to us not only pregnant with possibilities in regard to the use of the glands themselves, but also to open up new fields for therapeutic investigation. It is not only possible but likely that certain remedies, which have been found very useful by clinicians, may act indirectly by changing the activities of the glands of internal secretion. Thus, in pneumonia and other conditions in which the respiration may be seriously impaired, it is possible that the suprarenal bodies, recognizing the demand on the part of the respiratory muscles for a full supply of sugar, may secrete an increased quantity of adrenalin and thereby enable these muscles to carry on vigorous movements for many hours. Every practitioner of experience can look back over his career and remember cases in which children and adults have breathed at the rate of 40 or 60 times a minute, hour after hour, without apparently suffering as great a degree of exhaustion as would be expected. Any one who will stand by the side of such a patient and try to breathe as rapidly will find that before two minutes have elapsed he is rapidly becoming exhausted, but in the healthy individual there is no demand on the suprarenal bodies for an increased secretion of adrenalin, whereas in the patient whose life depends upon rapid respirations and whose central nervous system may recognize danger, a condition arises which is closely akin

to that in which an excess of adrenalin is secreted in an animal which, suffering from fright, endeavors to escape from an enemy which may be pursuing him. It may be that many drugs of high repute do not act directly as stimulants to the heart or respiratory center, but upon glands which in turn affect these vital parts.

CROUPOUS PNEUMONIA AND ITS TREATMENT.

Much of the confusion which has arisen in the minds of physicians as to the prognosis and treatment of croupous pneumonia has been due to the fact that diagnosis has heretofore been purely empirical, except that in some instances the bacteriologist made the report that the sputum did not contain pneumococci. Not rarely the physician would be called to two cases of pneumonia on the same day, each of them in the same stage of the disease and at the same period of life, and neither of them suffering from a primary disease which placed the attack of pneumonia in the class of terminal infections, yet, with exactly the same plan of treatment, or with no treatment at all, save rest in bed, one case proceeded to a prompt recovery and the other proceeded to an even more speedy death. In those instances in which diabetes, nephritis, or other maladies which impair vital resistance have been present prior to the pneumonic attack such a result is not really puzzling, but where these predisposing causes of fatality are absent, it has been difficult to reach a satisfactory explanation.

Within comparatively recent months the explanation is, however, becoming more and more clear, since the bacteriologist is now able to differentiate at least four different types of the pneumococcus, No. 1 and No. 3 being particularly virulent, whereas No. 4 has a low degree of virulence and, as statistics show, comparatively rarely causes death. Fortunately it seems possible to produce an antipneumococcic serum for No. 1 and No. 3, but no antipneumococcic serum for No. 4. This antipneumococcic serum has been tried by a number of clinicians and has given results which encourage its further employment. The great difficulty is that physicians are loth to resort to it in many instances until the patient is gravely ill, when the serum cannot be expected to rally or benefit a moribund patient. A more important difficulty, because it is not avoidable, is the necessity of employing a serum identical in its derivation to the microörganism which is causing the illness, for it would seem that there is no use in administering an antitoxic serum made through the agency of type No. 1 when the illness is due to type No. 2 or No. 3. This, in turn, requires that the bacteriologist shall not only determine that a pneumococcus is present, but that a number of days will be lost while he is determining its type, and by the time that he has made this determination the patient is too ill to be benefited by the use of the antitoxic serum. This factor alone greatly militates against the successful employment of this method of treatment and, at the present time, bids fair to prevent its use in so many cases that antipneumococcic serum cannot be widely and successfully employed.

The fact that bacteriologists can differentiate between the different forms of pneumococcus has, however, an important bearing upon other lines of therapeutic procedure. Heretofore when a certain line of treatment has seemed to give the physician excellent results in one case but has utterly failed in another, he has been at a loss to explain the difference in his results; whereas if, after a certain number of days, the bacteriologist reports to him that the recovery which followed his treatment occurred in a case of infection with pneumococcus No. 4, and that the death which followed his treatment occurred in a case of infection with pneumococcus No. 3, he will at once perceive that the odds were greatly against any efforts that he might make in the case of the patient who had a fatal termination, and this information enables him to more accurately gauge the correctness of his previous therapeutic observations.

RECURRENCE OF GALL-STONES.

The concept held universally by surgeons, one with which the internists are not entirely in accord, to the effect that disease of the biliary passage is essentially surgical, is advanced with unusual force by Deaver (*American Journal of Surgery*, February, 1917) in an analysis of upwards of 2000 cases of gall-stone disease, the study being designed primarily for the purpose of discovering the cause or causes of recurrence of biliary colic. A failure to remove all the gall-stones at the primary operation is he believes the most potent cause of recurrence of symptoms, and this failure is to a large extent, if not entirely, due to procrastination upon the part of the patient, encouraged by the physician, the recurring attacks being treated conservatively and the patients being subjected to a great variety of treatments, which, though doubtless of temporary benefit, have no curative effect upon the underlying lesion. During this conservative treatment the gall-ducts become dilated and the stones are apt to lodge in recesses, so that they cannot always be removed or even detected at operation.

Kehr holds that operation may be postponed for a few weeks or months when the inflammation is limited to the gall-bladder, but in cholangitis it should be resorted to after a second attack before the ducts have had a chance to dilate. He notes that the surgeon who gets a chance to perform an early cholecystectomy and drains the widely incised choledochus is only rarely confronted with a recurrent case.

Deaver believes that free and prolonged drainage of the gall-bladder or the common duct is the best means of overcoming recurrence, and makes it a practice to use large-sized tubes and allow them to remain *in situ* until they practically drop out. It is not always easy to determine whether the recurrent stones are overlooked at operation or whether they are formed again after operation. The impression is strong that reformation has taken place, inasmuch as the number of stones in many of the cases again operated on ranged from five or six to several hundred, which could hardly have escaped detection.

On the other hand, it is not always possible to clear the two primary branches of the hepatic duct. Some cases require several operations before permanent cure can be accomplished. There should be no hesitation in opening the common or hepatic duct to secure it. Other cases show renewed infection of the gall-bladder or the bile ducts. Failure to remove all infection at the primary operation is indicated by the presence of acute or chronic cholecystitis, chronic cholangitis, biliary cirrhosis, and pancreatitis at the subsequent intervention. Some of the less common causes of recurrence are obstruction at the papilla of Vater, biliary fistulas, internal and external, and interstitial pancreatitis and pancreatic lymphangitis.

Biliary cirrhosis may be associated with numerous minute stones in the common, the hepatic, and the smaller bile ducts, with occlusion of the papilla of Vater. For the relief of this condition only prolonged gall-bladder or common-duct drainage will suffice to bring about a permanent improvement or cure.

Chronic cholangitis must be reckoned with in the study of the causes of recurrence. Deaver has one patient wearing a T-tube now over three years, who is perfectly well and will not listen to removal of the tube, although he has had two previous operations. A number of his patients are wearing these tubes upon whom he has performed the second or third operation; all of these patients are doing their work as they did before being attacked. In this class of cases in which the gall-bladder can be left drainage by this viscus is the best and safest method. Although the aseptic formation of the radial cholesterine stones in the gall-bladder may occur in the absence of bacteria, all other gall-stones, the complex ones and the cholesterine-pigmented calcium stones, owe their origin to infection and obstruction.

Deaver quotes the words of Moynihan in reference to every gall-stone—"a tombstone erected to the memory of the bacterium

which lies dead within." Murphy states that the cholesterine, which forms 98 per cent of all gall-stones, is the product of dead epithelial cells. The stones by their presence in a more or less infected zone cause a continual deposit of cholesterine, which thus continually increases the number of stones "until finally there is the arrest of the microörganism of a more virulent type, which starts suppuration in the gall-bladder."

If infection be distributed over a great area of mucous surface there will result a large number of gall-stones. Deaver regards the appendix as the focus of infection for nearly all upper abdominal diseases, the gall-bladder affections, gastric and duodenal ulcer, pancreatitis, etc. This implies the removal of even a slightly troublesome appendix in order to avoid future trouble. The fact that 95 per cent of primary and only 15 per cent of secondary carcinomas of the gall-bladder are associated with gall-stones indicates that gall-stones are the cause and not the result of carcinomatous degeneration. Further pernicious results of neglected gall-stones are seen in myocarditis and kidney degeneration, as well as degeneration of the blood-vessels, diabetes, hematogenous infection, etc.

Although it does not deal directly with this phase of the subject Deaver's paper indicates that cholecystectomy is the operation to be chosen rather than cholecystotomy.

THE TREATMENT OF TETANUS.

Among the therapeutic victories of the present war has been recorded, and with some justice, the control of tetanus as a sequel to mixed infection, by prophylactic injections. As to the value of these and their general efficacy all are agreed, but there is some difference of opinion as to the dosage.

Concerning the treatment of the disease once developed—and many cases have developed in spite of these prophylactic injections—there is a wide divergence of opinion, nor can it be said that the treatment of tetanus is more thoroughly formulated than it was two years ago. This in spite of the enormous experience which the present conflict has enabled surgeons to acquire.

Leishman and Smallman (*Lancet*, Jan. 27, 1917) have made a study of 160 cases of tetanus which occurred in the hospital in France in eight months. Of these 118 died and 42 recovered, a case mortality of 73.7 per cent. This mortality can be contrasted with the previous group examined in the spring of 1915. In that series, among 179 cases there were 140 deaths, a case mortality of 78.2 per cent. Both series show a heavier mortality than that which has been recorded in home hospitals. In the first year, out of 231 cases analyzed by Sir David Bruce, there was a case mortality of 57.7 per cent, and for the second year, up to July 31, 1916, out of 195 cases a mortality of 49.2 per cent.

These four series show a slight improvement in case mortality on each side of the Channel, but also make it clear that cases are more fatal in France by about 25 per cent. The causes for the latter fact are incident to the class of cases; so desperately wounded that they are not able to be transported, and usually with serious complications such as sepsis and gas gangrene. The authors believe the highest incidence of tetanus occurs in wet weather. Among the fatal cases a large per cent exhibited extensive and severe wounds, and over 61 per cent were complicated by gas gangrene, over 78 per cent by severe sepsis. The percentage of these complications was much lower in the cases which recovered.

The average incubation period of all the cases was something over twelve days. Of the fatal cases, 115 in number, the average period was 10.7 days, and of the 42 recoveries it was 14 days. The shortest period of incubation was two days, the longest 90 days. It is worthy of note that the two cases of long incubation, respectively 52 days and 90 days, both resulted fatally.

As regards delayed tetanus, it is to be presumed that spores remain undestroyed in the tissues till they are in some way

stimulated to germination. There were 13 cases in the series in which the disease did not make its appearance until 21 days or more had elapsed. This may be assumed to be the limit of the normal incubation period. Of these 13 cases, 8 died and 5 recovered.

As to the influence of operation after tetanus declares itself, the practice seems to be decadent because of the heavy mortality dependent upon it. Of nine cases seven died.

As to prophylactic injections, it is well known that the earlier the preventive dose is given after the receipt of the wound the more likely is it to be of use, but since there is little positive information as to the effect of delay an effort was made to obtain precise details as to the number of hours which had elapsed between wound and injection. This was done in 66 of the 160 cases. Of the 43 cases which received within twenty-four hours a preventive dose of 500 or more units—less is never given—62.7 per cent were fatal and 37.2 recovered. Of 23 cases in which the giving of the antitoxin was for one reason or another delayed beyond twenty-four hours, 86.9 per cent died and only 13 per cent recovered. It is true that delay implies a period of neglect incident to war conditions, which in itself implies increased mortality. It was shown in this comparatively small number of cases that the incubation period was increased by prophylactic dose in those who recovered, even when the dose was delayed. No prophylactic dose was given in 15 of the cases, and 9 of these died—*i.e.*, 60 per cent. It should be noted that of the six who recovered, five were instances of men whose injuries, being of the nature of scratches or abrasions, were so slight that they did not report sick, and hence they did not receive any dose of serum. Others who received serum were of that unlucky class who were picked up some days after the injury.

As to the therapeutic use of tetanus antitoxin, the authors mention that there are no fewer than 15 possible combinations of the four routes by which this may be given. There are instances of each of these combinations having been employed.

Those in whom the total dosage had been below 20,000 units comprise 116 cases, of whom 91 died, a case mortality of 78.4 per cent. The remaining 41 cases received more than 20,000 units, and of these 24 died, a case mortality of 58.5 per cent. There is, therefore, a balance of 24 per cent in favor of the larger dosage.

In the cases treated in home hospitals it is noted that of the 175 cases therein analyzed into similar groups, below and above a total dosage of 20,000 units, we find that of 108 cases in the small-dose category 61 died, a case mortality of 56.4 per cent, while of the 67 cases in the large-dose class only 21 died, a mortality of 31.3 per cent; the balance here being in favor of the larger total dosage. These figures apparently prove the value of a full dosage.

As to the route of administration, the highest mortality was followed by the intrathecal one. This corresponds with Bruce's figures. The authors feel that their study, combined with that of Bruce, throws very considerable doubt upon the advisability of employing the intrathecal route, either alone or in combination, and further, it seems to indicate considerable virtues in connection with the employment of the subcutaneous and intramuscular channels, particularly the latter. In placing the choice of the intravenous route last, they state that they are in full agreement with the recommendation of the Tetanus Committee in their revised Memorandum, that this route should not be used. It introduces the possible element of anaphylactic shock and has done little if any good.

As to the intrathecal route, they are not inclined to support the recommendations contained in the Memorandum just mentioned when it says: "In a case of tetanus the first thing to do is to give an intrathecal injection of antitoxin." Bruce regards the evidence for and against it as not conclusive. The hope, in making the intrathecal injection, is that by bringing antitoxin into the cord we may effect a dissociation between the cell and the molecules of toxin.

If the intrathecal route is used not more than 10 Cc. of cerebrospinal fluid should be withdrawn and should not be replaced by a greater volume of antitoxin. They believe that the subcutaneous and intramuscular routes should be the ones employed.

Turning to the question of dosage this appears a most difficult matter to judge. Recovery will follow where the dose has been ludicrously small; others have died in spite of enormous dosage. The proper quantity to give must be a matter of surmise. If the combined subcutaneous and intramuscular routes be used, the daily dosage for the first few days should not fall below 10,000 units. The specific treatment should be commenced at the earliest possible moment and should be maintained effectively well into convalescence. With the recommendation of the Committee of repeating the initial prophylactic injection of antitoxin every six or seven days as long as there is any reason to fear tetanus, the authors are in full accord. Moreover, they agree that a preventive dose should be given prior to any secondary operation. For the reasons given above they think that it would be well to give such a dose by the combined subcutaneous and intramuscular channels, inoculating it at several points around the site of operation and at different depths of muscle on its proximal side. If time permitted this should be commenced forty-eight hours before the operation, but if the operation was one of urgency similar injections in the neighborhood of the operation wound, with perhaps injection into the sheaths of prominent nerves, would appear a wise routine procedure. Fifteen hundred units will be a suitable amount to give.

Carbolic acid treatment has been practically abandoned, as has magnesium sulphate. Sedative drugs have been used in the great majority of cases. In order of frequency these were as follows: Chloral, bromide, morphine, chloretone, atropine, omnopon, scopolamine, alcohol, chloroform, and paraldehyde.

REPORTS ON THERAPEUTIC PROGRESS.

OBSERVATIONS ON THE TREATMENT OF CEREBROSPINAL FEVER.

In the *British Medical Journal* of November 18, 1916, WORSTER-DROUGHT well says that as a definite line of treatment in cerebrospinal fever (meningococcal meningitis) is as yet not satisfactorily determined, methods of considerable diversity being still employed by different observers, any record of a number of consecutive cases treated by a particular method may be of some value in the ultimate elucidation of the best means to combat the disease. There is still much difference of opinion as to whether serum is or is not of any efficacy, whether cases are best treated by lumbar puncture alone, or if vaccines assist in contributing toward a successful issue.

The average mortality in epidemics of cerebrospinal fever from 1904 to 1905 was 80 per cent. In 1913 Flexner published a summary of 1294 cases treated with the serum bearing his name and yielding a mortality of only 30 per cent. Unfortunately, however, the cases occurring in England from the end of 1914 onward did not apparently show the good results with serum that were expected. In the cases occurring at Royal Naval depots (1914-15) the mortality of serum-treated cases was 64 per cent, but in many instances the serum treatment was not commenced until late in the disease, often the fourth to the seventh day, sometimes even later. The doses, also, in certain cases were quite inadequate. In the report of the Medical Research Committee on cerebrospinal fever (1916), the majority of reporters seemed unable to decide how much benefit accrued from serum and how much from the associated lumbar puncture. The average mortality appears to have been as high as 59 per cent in the serum-treated cases mentioned in this report. More recently, however, F. W. Andrews, using

Lister Institute serum (1916) on 11 consecutive cases, had a mortality of four—that is, 36.36 per cent; two of the fatal cases were under a year old.

On the other hand, Gaskell and Foster treated 30 cases of cerebrospinal fever by frequent lumbar puncture alone; their mortality was 30 per cent. Morgan in 1908 had a mortality of 44 per cent in 18 cases treated in the same manner.

During 1915 vaccines were frequently employed concurrently with other methods of treatment. The few cases referred to by Rolleston in which vaccine was used, many of which Worster-Drought had the opportunity of observing, gave an apparent mortality of only 25 per cent. Most of these cases, however, were well on the way to recovery before the vaccine was given; they were also, in addition to lumbar puncture, treated with either serum or soamin. Of other observers, Warren Crowe considered that autogenous vaccines did good in influencing temperature. He commenced with the very small dose of one million organisms, while Walker Hall gave a polyvalent vaccine every two days in gradually increasing doses from 25 to 500 million, preferring it to serum. J. R. Collins recommended starting with a half to one million organisms, and is of the opinion that it does good, especially in chronic cases. T. J. Horder also quotes a case of Garrod's in which vaccine certainly appeared to benefit a case running rather a prolonged course. Sophian has further demonstrated antibodies in the blood of persons injected with vaccines. Among other authors there is considerable doubt existing as to the relative value of vaccines. Worster-Drought's own experiences in 1915 left him with the distinct impression that vaccines were of material assistance once cases had passed the initial acute stage and were full worthy of a further trial. The series of cases here dealt with, therefore, have been treated by the combined method of serum administered intrathecally and vaccine subcutaneously.

The one fact on which the majority of observers are agreed is that the chemical substances hitherto employed—for example, soamin, protargol, lysol, etc.—are of no value in influencing the disease. Certainly this was Worster-Drought's conclusion with regard to soamin in 1915. Recently Flexner and Amoss have further shown that lysol and protargol have no effect upon meningitis in guinea-pigs or monkeys, and moreover, being antiphagocytic, do more harm than good.

In estimating the value of any particular form of serum treatment it is essential to know the day of the disease on which the treatment was commenced, the exact dosage, and also the frequency with which the serum was given. It is unfair both to the serum and the physician to state in a statistical report that the mortality of serum treated cases was such and such a number when the serum injection has not been commenced until the fifth or sixth day, the dose has varied from 5 Cc. to 40 Cc., and the frequency of administration from twice a day to once a week.

All observers emphasize the supreme importance of early treatment. All have found that the earlier treatment is begun the better are the results.

When first performing lumbar puncture on a suspected case, if the fluid shows any turbidity, it is advisable to administer serum at once without waiting for the bacteriological examination. This, as far as possible, has invariably been Worster-Drought's practice; valuable time is saved, and no harm can be done by the serum to a possible case of pneumococcal or tuberculous meningitis. A similar procedure was also followed by Pignot and Terrasse at the French front with good results.

The serum used in Worster-Drought's cases was the Lister Institute polyvalent serum (1916), prepared from the various strains of last year's epidemic. The summary of the treatment adopted is as follows: Serum is given at the earliest possible moment, as stated previously, without waiting for the bacteriological report. The initial dose is 30 Cc. This amount is repeated daily until the clinical improvement is quite definite and undeniable; the bacteriological findings are inclined to be mis-

leading if relied upon solely, as clinical symptoms are often well marked when organisms can neither be seen nor cultivated. The minimum period for continuance of serum is four days, thus covering the merely apparent improvement so often seen on the second or third day. This practice is also strongly advised by Netter, no matter how great the improvement may appear. The dose is always 30 Cc., excepting when less than this amount of cerebrospinal fluid can be obtained; in such a case the fluid withdrawn should exceed the amount of serum injected by at least 5 Cc. When the clinical improvement is quite decided, serum may be omitted; lumbar puncture is then performed daily until the fluid is clear to the naked eye. Should there be any sign of the reappearance of symptoms, particularly mental relapse or increased turbidity of fluid, serum administration is recommenced and continued on the same lines. The amount of fluid withdrawn is always practically the maximum that can be obtained—that is, until it flows through the needle at about the rate of one drop in five seconds. He has never seen the slightest misadventure follow this evacuation, not only in the present series of cases, but in many others treated by various methods.

There is some difference of opinion concerning the advisability of a general anesthetic for the performance of lumbar puncture. Horder, Robb, Gaskell, and Foster regard anesthesia as infinitely preferable. The latter authors give two reasons: (1) Necessary in delirium; (2) danger of breaking a needle. Having performed some hundreds of punctures in routine neurological work, including out-patient departments, Worster-Drought does not consider an anesthetic at all necessary as a general rule. It is essential in tetanus, but in cerebrospinal meningitis he has only used anesthesia four or five times when the patients have been very violent. Provided one has an assistant with a thorough knowledge of the requisite position in which to hold the patient, the operation is performed without difficulty, always allowing moderate skill on the part of the operator. Two patients suspected of being mild cases of cerebrospinal fever were admitted, having been punctured elsewhere under general anesthesia. When the operation was performed without an anesthetic, they stated afterward that they much preferred it thus, not being troubled by the subsequent vomiting. Further, an anesthetic requires two medical officers instead of one, it occupies more time, and when given daily there is a risk of its considerably interfering with feeding. As regards the second point mentioned above, that of breaking the needle, he can only say that, so far, he has had the good fortune to escape this calamity.

The serum is much better run in by the gravitation method than injected by means of a syringe. However slowly the serum is forced in with a syringe, there is a risk of respiratory failure occurring from a sudden increase of intracranial pressure. This he has seen occur, the patient only being brought round with extreme difficulty. In some 400 injections with a funnel and tube, including the administration of salvarsanized serum and tetanus antitoxin, he has never seen any indication of collapse or the slightest bad result. It seems unnecessary, therefore, to take the further precaution, advocated by Sophian, of registering the blood-pressure as an ocular guide to injection by gravity.

THE TREATMENT OF INFANTILE PARALYSIS.

In the *New York Medical Journal* of November 25, 1916, FRAUENTHAL states that he wishes to call attention to a class of active and passive exercises done before a mirror, having the patient concentrate his mind on the affected muscles. When the origin and insertion of the muscles cannot be approximated by an effort of the will, the attendant aids in the effort.

After a time, however, it is found that the motion may be brought under control of the will. It is known that when motion is guided by mental concentration, the sulci in the gray convolutions in the brain, presiding

over this motion area, are increased as well as the caliber of the nerve going from the cortex to the periphery. It has been demonstrated by Anderson, of Yale, and others, that when a person is securely placed on a body balance and concentrates his mind on an extremity, the hyperemia thus produced tips the body balance in the direction of the limb.

A moment's thought makes clear the fact that the nerve efficiency or nerve control, as displayed by the gyrations of the nautch dancer, can be developed by any person in any set of muscles if a proper effort is made. The stimulus transmitted from the brain to the periphery depends on the caliber of the conducting nerves, as the diameter of copper wire regulates the volume of electric current capable of transmission. We must realize that the concentration of the mind on the muscular effort not only initiates the movements, but also sends blood to the controlling nerve centers, producing growth and development in the conducting filaments.

In this treatment of infantile paralysis, in addition to the application of massage and treatment by galvanic, faradic, sinusoidal, and high-frequency current, in children over three years of age a course of muscle education before a mirror is added, which Frauenthal regards as one of the most important, because recovery is best brought about by the action of the will, influencing action after massage and electricity have brought the muscles under the control of the mind.

The muscles most frequently involved in infantile paralysis are the peroneal group, and the plan of exercising one set of muscles can be utilized in another set of muscles involved. Placing the child in a chair before the mirror in a comfortable position, Frauenthal first approximates the origin and insertion of this muscle group by bringing the foot up to a right angle with the leg, and then urges the child to aid in bringing up the little toe side of the foot through an arc of about 30°. If the muscle contraction is such that the child cannot do this alone, the instructor places one hand on the knee to keep the leg in position, and places the other hand under the foot, which greatly aids the efforts of the child to produce the required contraction. This should be repeated several times, but not the point of overtiring the weakened muscles. Each set of muscles should be contracted in a similar manner. If the motion cannot be brought about, the mental effort should still be made for the attainment of this action.

THE AFTER-TREATMENT OF INFANTILE PARALYSIS.

SAYRE states in the *New York Medical Journal* of November 25, 1916, that in talipes calcaneus the operation devised by Whitman has given most excellent results. The astragalus is removed; a thin section of bone is then cut from the outer surface of the os calcis and cuboid. On the inner side the sustentaculum tali is cut away and the calcaneonavicular ligament is partially separated from its attachments. The cartilage is then removed from the two malleoli, and if necessary they are reshaped to permit accurate adjustment. The foot is then displaced backward as far as possible so that the external malleolus may cover the calcaneocuboid junction, while the inner malleolus is forced into the depression behind the navicular. The peronei tendons which were divided at the first stage of the operation are then attached to the insertion of the tendo Achillis and to the os calcis by strong silk sutures. The object of the removal of the astragalus is to assure stability and to prevent lateral deformity by placing the leg bones directly on the foot. The object of the backward displacement of the foot is to direct the weight upon its center and thus remove the adverse leverage which induces dorsal flexion.

In cases of flail knee, arthrodesis has been advised, and in selected cases is undoubtedly a useful operation. It has various objections, however, which do not hold good in the case of the ankle. A patient with a stiff knee is much hampered in sitting down, and in the majority of operations is more comfortable when supplied with an apparatus which allows flexion

while sitting down than if the leg is held rigidly in extension all the time. The operation is advocated by some on the grounds that it is too expensive for a poor man to use a splint, but it seems to Sayre that this position is illogical. If a man's joint is resected, he is incapacitated from work for a period of three months. Supposing he earns ten dollars a week; this is a loss of one hundred and twenty dollars. The cost of his support in any hospital during this period would be two dollars a day, in a great many hospitals a larger sum. This will make one hundred and eighty dollars. The cost of the surgeon's time during the operation should be taken into account, as it is fair to presume that even if we make no charge for the operation—it being done in the hospital—nevertheless the time consumed might be put to a profitable account elsewhere by the surgeon, so let us charge twenty dollars for the surgeon's time, making three hundred and twenty dollars in all. This sum invested at 4.5 per cent would bring in fourteen dollars and forty cents per annum, more than enough to purchase the original splint and keep it in repair during the patient's life. Sayre believes that many operations which are advocated on the grounds of economy are really more costly than conservative measures if we examine the situation with care. Provided that an operation is to be done on the knee, obviously it should be deferred until after the cessation of bone growth, as early resections of the knee are apt to result in great permanent shortening from the interference with the epiphyseal cartilage. In the hip, when the gluteal muscles are completely paralyzed, it may be wise to perform an arthrodesis, cutting off the upper edge of the femoral head and gouging out the acetabulum, thus allowing two raw bony surfaces to come in contact and so form a secure union, as suggested by Albee in painful arthritic conditions. Here again the question of the usefulness of an ankyloid hip must be considered.

These cases of gluteal paralysis give the most difficult problems with which we have to deal, and present the most unfavorable prognosis.

Many patients walk quite well who have almost no power in the quadriceps femoris but have a well-balanced knee-joint, but the patient with paralyzed glutei is in most unstable equilibrium and can rarely do without apparatus if the paralysis is bilateral.

To summarize the treatment, Sayre would say: Do not do too much at first; give the patient absolute rest for many weeks. Prevent deformities by opposing contracting muscles. Later on, use gentle massage movements, active, passive, and restrictive. Endeavor to reëstablish the path of nerve control to the muscle. Aid this by electric stimulation in suitable cases. If necessary, employ support to prevent undue stretching of muscles, or ligaments, or deformity of bones. Later on, if deformities have developed, do such surgical operation as may be necessary to put the skeleton in a position best to support weight, and to balance the opposing force of muscles so as to preserve equilibrium. By these means many patients who otherwise would be hopelessly bedridden will be enabled to go about in comparative comfort.

TREATMENT OF GOUT.

CHACE in the *New York State Journal of Medicine* for November, 1916, reminds us that whether uric-acid retention is the cause of gout or is an index of the retention of some unknown substance which is the etiological factor is only of academic interest. The important point for the internist is that the improvement in the condition of the patient is accompanied by a corresponding reduction of the uric acid in the blood.

The aim of treatment is twofold: first, to prevent the formation of uric acid, and secondly, to facilitate its elimination.

Patients with a gouty tendency should avoid a sedentary life and should take light exercise, such as golf, walking, horseback riding, and indoor gymnastics. The skin and muscles should be kept in a healthy condition by massage, baths with friction rubs, and an occasional Turkish bath.

The dietetic treatment of gout is based upon the estimation of the patient's ability to eliminate exogenous uric acid, his endogenous excretion of uric acid having been previously determined.

The purin-free diet given in the table below has been found useful for this purpose. After the patient has been on this diet for three days fairly constant values for endogenous uric acid are obtained. The amount of uric acid above this figure found in the urine when the patient is taking purin is exogenous. A persistent daily output of less than .35 mg. of endogenous uric acid establishes a diagnosis of gout.

Purin-free Diet.

Breakfast: Apple or banana, cream of wheat or farina, with cream and sugar, one egg, cup of cereal coffee with cream and sugar, toast with butter.

Dinner: One egg, baked potato with butter, string-beans, rice or macaroni, baked apple with sugar, glass of milk.

Supper: Rice with butter, cream cheese, bread with butter, stewed pears or rice pudding.

Following the suggestion of Von Noorden the uric-acid-forming possibilities of various meats are given in the following table:

Accessory Diet with Articles of Food with Known Uric Acid Equivalents.

100 g. roast meat (beef, veal, lamb, pork, mutton, or ham).
100 g. salmon.
70 g. beefsteak or veal cutlet.
200 g. fish, lobster, or crab.
2 dozen oysters.
1 spring chicken.
75 g. lentils.
155 g. spinach.
200 g. peas or beans.

One hundred grammes of lean roast beef produces .14 mg. of uric acid, of which approximately 50 per cent is excreted, respectively, in the urine and feces. By determining, according to the suggestion of Von Noorden, the eliminative capacity of the body for exogenous uric acid, it is possible to keep the daily intake of purins well within this limit. On the other hand, Umber has advised determining the number of days required to eliminate the uric acid arising from a definite amount of purin substances and limiting the ingestion of such substances to intervals which prevent the retention of uric acid. This method emphasizes the importance of interspersing purin-free days in the diet so as to insure the complete elimination of exogenous uric acid. As these procedures necessitate the accurate collection of twenty-four-hour specimens of urine and the careful estimation of the uric-acid content of specific diets, they have proved cumbersome and are being superseded by the simpler procedure of examining the blood for uric acid. The amount of uric acid reduction in the blood obtained by placing the patient upon a purin-free diet is shown in the following table:

Effect of Diet and Drugs on Blood Uric Acid—Illustrative Cases.

	T. B. Gout.		H. L. Gout.		G. C. Gout.		F. S. Hysteria.	
	Before.	After.	Before.	After.	Before.	After.	Before.	After.
Purin food.....	3.3	5.5	6.4	8.5	5.5	6.3	..	..
Salicylates.....	4.4	1 4	..	..	..	..	4.0	0.8
Atophan.....	4.4	2.5	..	..	..	..	..	..
Saloxyl.....	..	..	..	..	5.5	2.4	..	..
Radium.....	4.0	4.1	..	..	..	..	..	..
Colchicum.....	4.4	4.4	..	..	..	..	4.0	3 5
Quinine.....	..	..	..	..	..	..	4.1	5 0
Diuretin.....	4.4	5.3	.	..	..	..	4.0	4.1

In the dietetic management of gout the uric acid content of the blood should be determined with the patient on a mixed diet, then the amount that this figure can be reduced by a purin-free diet should be ascertained. By this procedure a reduction of .2 mg. of uric acid per 100 Cc. of blood is frequently noted. To obtain a constant figure the blood should be taken before breakfast. By the careful addition of small amounts of purin to the diet the patient's tolerance for uric acid can be determined.

In prescribing a permanent diet it is well to keep the purins within the patient's eliminative capacity and to interpose purin-free days at frequent intervals.

The best results are obtained by giving a well-balanced diet, particular care being taken to maintain the patient's strength. An excess of carbohydrates results in glycosuria, while too large an amount of fats induces obesity, which places too great a strain upon the heart and arteries. An initial condition of obesity should likewise be corrected. For a patient weighing 150 pounds a daily intake of 70 grammes of protein, derived largely from vegetables, 200 grammes of carbohydrates, and 150

grammes of fat, yielding approximately 2500 calories, is necessary to maintain bodily vigor. As the uric-acid-forming possibilities of red and white meats as well as of fish are identical no distinction need be made. Boiled meats contain less of the precursors of uric acid than those which have been basted.

The intake of sodium chloride is limited because sodium salts favor the deposition of urates in the tissues. Coffee, tea, and cocoa, owing to their purin content, should be used sparingly, if at all. Alcohol in any form interferes with the elimination of uric acid. The condiments irritate the kidney in the process of elimination and should be avoided. It is well known that strawberries, oranges, bananas, cucumbers, and tomatoes intensify the symptoms of gout. Water is one of the best eliminants of uric acid. Better results are obtained from the use of saline mineral waters. The daily administration of a small amount of alkalies favors the deposition of uric acid in the tissues, although such treatment does tend to prevent the deposition of the uric acid of the urine.

There is evidence to show that uric acid is not affected by the salt of lithium. The last table shows that atophan, salicylates, and saloxyl deplete the blood of uric acid, and that radium, colchicum, diuretin, and quinine have no effect. It has been shown that the lowest level of uric acid in the blood is obtained after three days' administration of atophan. Atophan is best given in half-gramme doses with water and sodium bicarbonate four times a day. Although there is a return of uric acid in the blood to its former level a few days after the discontinuance of atophan, it is beneficial to produce periodic reductions. Many patients are kept well by taking atophan during the first four days of each month. The salicylates produce just as great reduction in the uric acid of the blood, but owing to their irritating effect on the kidney should be given guardedly in renal conditions.

For the acute attack of gout colchicum is the sovereign remedy. Thirty minims of the tincture of colchicum should be given with fifteen grains of citrate of potash every four hours until the distressing symptoms are relieved. It should then be discontinued at once, because of its depressing effect. The use of colchicum should be limited to the attack, as it has no effect on the purin metabolism at any other time and is of no value in preventing uric-acid accumulations in the body. The bowels should be kept well open and large amounts of water ingested. Local applications of oil of wintergreen or menthol give great relief.

There are many preparations, of which piperazine is a fair sample, which dissolve uric acid in a test tube, but, unfortunately, have no effect in eliminating uric acid in the body.

TRICHLOR-TERTIARY-BUTYL ALCOHOL OR CHLORETONE ANESTHESIA.

In the *Journal of Pharmacology and Experimental Therapeutics* for November, 1916, ROWE states that the following procedure has been found very satisfactory for anesthetizing experimental animals, particularly dogs, which are to be used for blood-pressure experiments. The dog is weighed and the dose, 0.4 gramme per kilogramme body weight (or about 3 grains per pound), is quickly measured and administered. The use of a 40-per-cent solution of the drug is well suited to the purpose since 1 mil (1 Cc.) contains 0.4 gramme and should, therefore, anesthetize 1 kilo weight of the dog. The 40-per-cent solution is best prepared by dissolving the weighed amount of the trichlor-tertiary-butyl alcohol in as small an amount of alcohol as possible and afterwards bringing the solution up to the required volume by adding water and just enough alcohol to keep the drug in solution. The finished solution will usually contain 40 to 45 per cent of alcohol by volume. Where much animal experimentation is done, it is best to prepare 100 to 200 mils of this 40-per-cent solution, since it is very stable.

A smaller dose of 0.3 gramme per kilo

will often suffice to produce the necessary anesthesia, but where rapid and complete action is desired and where the recovery of the animal after twelve to twenty-four hours is not essential to the experiment, Rowe has found that the best results are obtained when the larger dose of 0.4 gramme per kilo is given.

The administration of the dose is accomplished by chaining the dog to some stationary object and drawing the animal back by one hind leg, after which the injection of the drug into the peritoneal cavity can be quickly made without danger of being bitten if the dog is so inclined. Considerable delay and difficulty is encountered if the solution is injected into the bladder by mistake, but if the site of injection is well forward toward the diaphragm, the solution will never enter the bladder. The injection occasionally is followed by some evidence of the irritating action of the alcohol, but this is quickly overcome by the local anesthetic action of the drug. Within five minutes after the injection the first results are noticed in a restlessness of the animal and some muscular incoördination. Very soon thereafter the animal is completely prostrated without a struggle, except in very rare instances, and about twenty minutes after the injection complete anesthesia is obtained, with the disappearance of the last reflex. Such a condition makes unnecessary the paralyzing of the vagi and the use of artificial respiration, except, of course, in experiments involving the opening of the thorax.

The large dose of trichlor-tertiary-butyl alcohol (0.4 gramme per kilo) acts quickly at first, and unless it greatly exceeds the minimum lethal dose, death will not result for from one to three days. In animals of abnormally low resistance, which condition can usually be recognized by an emaciated appearance, it is best to give a considerably smaller dose and follow it one-half hour later with more of the anesthetic if necessary. Small dogs weighing less than 10 kilos require only about three-fourths as much of the drug as the healthy average sized specimen. Animals that are pregnant, and in some instances those that have been pregnant, require a much larger dose to bring about the required anesthesia, and are usually more or less unsatisfactory as experimental animals.

Trichlor-tertiary-butyl alcohol can be used in experiments where the recovery of the animal is desired, if a preliminary narcosis is produced by a hypodermic injection of morphine and followed with an intraperitoneal injection of 0.2 gramme trichlor-tertiary-butyl alcohol per kilo. This anesthesia will last four or five hours and recovery will be gradual but sure. Under these conditions more time is required to bring about the anesthesia, and the nausea produced by the morphine is a disagreeable feature. However, there is the marked advantage that the operator can work without the aid of an anesthetist and that there is a steady plane of anesthesia for the work.

In summarizing the advantages of trichlor-tertiary-butyl alcohol as an anesthetic in animal experimentation, it can be briefly said that a dose of 0.4 gramme per kilogramme body weight injected intraperitoneally produces rapid and complete anesthesia lasting from twelve to forty-eight hours with the one injection. It is easily administered, requires no attention after the first dose, and gives a very steady plane of anesthesia which is well suited to blood-pressure investigations or experimental surgery of all kinds. If the recovery of the animal is desired, morphine narcosis should be first produced and followed with one-half the above mentioned standard dose of the drug.

THE CONTROL OF CEREBROSPINAL FEVER.

The *Lancet* of February 10, 1917, emphasizes the fact that the spread of cerebrospinal fever is by healthy persons who carry the meningococcus in the nasopharynx, themselves escaping the disease, and it is estimated that some 2 per cent of the population may be carriers under ordinary circumstances, while at certain times and in certain districts the percentage may be

much higher. The proportion of carriers who develop the disease is an extremely small one. Captain Sheffield Neave, who writes in the *Lancet* of February 10 of an epidemic in East Suffolk numbering 73 cases, says: "No contacts were known to catch the disease. The insidious mode of spread accounts for the discontinuity usually observed in cases of cerebrospinal fever, and renders the disease exceedingly difficult to control. More than one type of meningococcus may be concerned in producing the disease, and the term parameningococcus has been introduced for that type which showed serological nonconformity with the classical organism. The first important research undertaken by Lieutenant-Colonel Gordon, after surmounting initial difficulties, was a serological investigation into the strains of meningococcus concerned in the existing epidemic. Taking as his criteria the phenomena of agglutination with specially prepared univalent serum, and in particular the power of absorbing specific agglutinins, he found that the races of the microbe identified in the cerebrospinal fluid in the epidemic of 1915 fell into four groups, which were similarly encountered in last year's epidemic. He termed them Types I, II, III, and IV, and proved them to breed true and to remain unaltered in their serological characters after a year's culture. In any given case only one type has been detected, and always a single type, in both nasopharynx and cerebrospinal fluid of a particular patient. The close contacts of a case have also usually harbored the same type as the affected individual. The term "epidemic type" suggested by Lieutenant-Colonel Gordon seems a justifiable one.

The practical difficulty confronting those who were endeavoring to control the spread of the disease amongst the military forces was that the isolation of the numerous positive contacts involved serious interference with the necessary training of healthy men. Now in investigating nasopharyngeal strains of the meningococcus, both in contacts and non-contacts, it had been seen that quite a considerable proportion of them did not correspond serologically with the epidemic types. It was therefore determined to segregate only those positive contacts who were ascertained to be carrying meningococci of the epidemic types. The reduction in numbers thus affected had the immediate result of rendering practicable the policy of temporary isolation. It may be admitted that this procedure is not perfect, but from the examples given in Lieutenant-Colonel Gordon's report it appears to have met with considerable success. Thus, to quote a single example, Captain R. R. Armstrong swabbed no less than 10,000 men and provisionally isolated 410 as carriers of an organism resembling the meningococcus. Lieutenant W. J. Tulloch subsequently examined 324 serologically (the remainder having meanwhile become free of the coccus) and was able to release 103 of them on the agglutination results. No evidence came to hand that any single man of this infected garrison passed as negative by Captain Armstrong either developed the disease or passed it along to another. Whilst attended with such success in military practice it is nevertheless obvious that this mode of controlling cerebrospinal fever is not readily applicable to civil practice.

Having weeded out the probably important carriers, Lieutenant-Colonel Gordon went on to perfect a new method of curing them. While the majority of carriers rid themselves of their meningococci in a week or two, a certain number retain them for weeks or months, and no method of cure has hitherto met with much success. Trials were made by saturating the air of a small room with extremely fine droplets of a disinfectant, as had previously been done by Küster. A Lingner spray was first used, but was later replaced by an apparatus designed by Second Lieutenant E. Gordon, R. E., which proved more efficient, and is fully described and figured in the report. The first disinfectant chosen for trial proved the best. It was toluene-sodium-sulphochloramide, briefly known as chloramine-T, a substance prepared by Dr. Dakin

and Professor Cohen in the course of researches upon the mode of action of the hypochlorites. It is non-toxic and does not coagulate albumin. The air so saturated was found to sterilize plate cultures of staphylococci and yet to be tolerated by human beings for fifteen or twenty minutes. A group of 14 chronic carriers received the treatment daily, and all but three were cured after at most 13 daily inhalations, though some had been carriers for 10, 12, and even 17 weeks. Later trials were made with zinc sulphate in place of chloramine, but the results were much less satisfactory. Chloramine treatment appears to offer a better prospect of quickly curing the carrier condition than any which has yet been tried. Besides these two important investigations the report contains a large amount of valuable detail, notably in Captain M. Flack's report on his work in the London district during 1916. As a whole, it deserves careful study and is encouraging as an earnest of further progress.

THE AFTER-CARE OF INFANTILE PARALYSIS FROM THE POINT OF VIEW OF THE MEDICAL PRACTITIONER.

In the *Long Island Medical Journal* for November, 1916, AGER says that by after-care is meant the treatment of those children who have acquired a greater or less degree of paralysis and possibly deformity as a result of this infection. According to the orthopedic surgeons the after-care is that which is employed when the acute stage is past; and the acute stage is defined as the period during which pain and tenderness exist. It is generally conceded that any form of active treatment is dangerous and probably harmful so long as any tenderness is present. This acute period is exceedingly variable, but in a large majority of cases it does not last more than four weeks and in a considerable percentage but two weeks.

Even during the acute stage something may be done to prevent deformities by keeping the limbs and back in a fairly normal position by support, and by counteracting the effect of gravity and the weight of clothing. Nevertheless, at this stage damage may be done by forcible or painful retention of the body in uncomfortable attitudes. Careful observation has convinced Ager that better end results are obtained by permitting considerable flexion of the knees, thighs, and back in cases in which marked tenderness is present, than by retaining the body in an uncomfortable attitude. In other words, the greatest amount of rest is secured to the inflamed areas by maintaining every muscle in as comfortable a position as possible by the support of pillows, cushions, and pads, regardless of the attitude that may be assumed.

If a careful study is made of the teachings of the different orthopedic schools it will be found that there is considerable difference of opinion as to the relative value of massage, electricity, plaster, and braces. The tendency at present appears to be to employ massage and electricity to a much greater degree than ever before. This is due to the popularity of Dr. Lovett and his followers, and as Ager is not skilled in orthopedic work he will not venture to express an opinion as to the relative value of different lines of treatment. Nevertheless he is under the impression that the orthopedic work done in New York has given as good results as that done elsewhere. However, we all know what the after-treatment is intended to accomplish, and we must think for ourselves in drawing conclusions as to the best methods to secure the desired results.

At the end of the acute stage we are confronted with a certain amount of destruction, by hemorrhage and inflammatory action, of central nervous areas, most of them located in the motor portion of the spinal cord. Surrounding these areas in which actual destruction has taken place there are large areas in which temporary injury has been inflicted by edema and pressure. The areas which have been only slightly damaged return rapidly to a normal state if not interfered with. So long as nutrition is maintained by proper food, sun-

light, and elimination, the improvement will be marked unless injurious treatment is given, as is undoubtedly the case in many instances.

As a result of the actual destruction of nerve centers the so-called residual paralyses occur with the marked wasting and deformities which used to be considered inevitable. Thanks to the orthopedic surgeons these effects of the disease are also being prevented or corrected to a greater degree every year; but this work requires the most skilful training and the long-continued coöperation of parents and family physicians. Briefly we aim by intelligent treatment to assist the body in every way possible in its wonderful powers of regeneration, and at the same time to prevent the harmful results of the damage that has been done.

EXOPHTHALMIC GOITRE.

In the *Lancet* of November 11, 1916, MACKENZIE states that his present views on *x*-ray treatment are: It may prove to be far the best means of treatment at our command. It must be applied in no half-hearted way. It must be persevered with and in many cases continued for a long period of time. It is most likely to prove beneficial in cases in which the thyroid enlargement is moderate and the patient is not so seriously ill as to necessitate confinement to bed. He thinks it may prove valuable in bringing about a retrogression of the remaining thyroid after a hemithyroidectomy. He has not at present sufficient evidence to speak of its usefulness where the goitre is a very large one. It has seemed to fail, as other remedies do, in cases of a severe type and rapid course. The trend of present experience in respect of *x*-ray treatment is decidedly in favor of its further trial, and he would draw attention to a few recent important references to its effects.

Halsted has recently been making trial of *x*-ray treatment of the thymus which Mackenzie has mentioned he employed seven years ago without any very striking results. But Halsted has used it in cases in which he had previously removed most of the thyroid, and the resulting improvement was not satisfactory. In these cases he thinks the *x*-ray treatment has been very satisfactory.

Murray has stated that treatment with *x*-rays has in some of his cases proved to be of great value. The gland gradually diminishes in size and the symptoms subside. These changes are, however, slow in development, so that the full effect of the treatment is not obtained until some months have elapsed. Fifteen to twenty weekly treatments have brought about great improvement or practical recovery in some cases. In others only slight improvement has followed similar treatment. Mackenzie thinks it is worth while to persevere with *x*-ray treatment for as long as twelve months if satisfactory progress is made.

Stoney has written enthusiastically of the effects of *x*-ray treatment. Of 48 cases treated (of which 22 had no exophthalmos) 14 (of which 5 had no exophthalmos) were cured. The average number of treatments of the cases cured was 31, the smallest number was 10, and the largest 50. She gives a small dose each time for about seven to ten minutes. In acute cases she gives it twice a week for a month, then stops it for a fortnight. In chronic cases one treatment weekly suffices, but it must be continued in severe cases for six to eight months. Early cases are cured with a few treatments. Long treatment is only required where the case is very acute, where rest is unattainable, or where the case is of old standing.

Of the effects of radium treatment Mackenzie has no personal experience to relate. Reports which have been published by Turner and others seem to show that they are very similar to those of *x*-rays, and if this is confirmed radium treatment would be a valuable addition to our armamentarium. It is obvious that radium treatment might be employed in cases in which *x*-ray treatment was unobtainable.

Surgical methods of treatment of exophthalmic goitre have long been advocated

and employed with the object of bringing about a more certain, a more lasting, and a speedier cure than can be obtained by other means. In the first cases in which partial thyroidectomy was performed the operation was done to relieve dyspnea, as in a case operated on by Lord Lister in 1877. It was found that not only was the dyspnea relieved but all the symptoms were alleviated.

If the controlling and fundamental agent in keeping up the symptoms of the disease was the hyperplasia and overactivity of the thyroid gland, it seemed the most hopeful and rational means of treatment was to attempt to control that, and to the surgeon the use of the knife seemed the most natural method of dealing with it. He could cut away as much of the gland as was superfluous and leave the patient with just as much thyroid gland as was necessary for health. The theory seemed attractive; how did it work out in practice? Unfortunately, it was found that the operation had special dangers of its own, and while partial thyroidectomy in ordinary goitres was a comparatively safe operation, in exophthalmic cases it not infrequently proved fatal. The earlier statistics showed a death-rate of over 12 per cent for the whole number, and among the severe cases it was as high as 22 per cent. Later statistics show better results, however.

Mackenzie's own experience of operation in cases of exophthalmic goitres has, on the whole, been very unfavorable. In several chronic cases in which the tumor was large partial thyroidectomy has been successfully carried out with relief to the patient, but although he has seen patients who have been benefited he has not seen any case that he could say was actually cured.

The risks attending thyroidectomy being considerable, surgeons have introduced modifications of the operation to diminish the danger. Ligature of the thyroid arteries was done as a preliminary in many cases, and according to Kocher it was found that ligature of one superior thyroid artery brought about a slight amelioration, which was increased by ligaturing both, and still more by ligaturing the inferior thyroid on one side in addition. So it came about that ligature of the arteries was frequently done as a preliminary to hemithyroidectomy and sometimes as a curative method in itself.

Mackenzie's views of operative treatment are:

1. If done at all operations should be performed under local anesthesia. Local anesthesia is specially indicated in younger subjects.

2. Ligature of the thyroid arteries does not appear to have any appreciable effect on the disease, and therefore, if done at all, it should only be as a forerunner of thyroidectomy.

3. Thyroidectomy does not cure unless a sufficient amount of gland is removed.

4. If possible, it is better to remove more than an entire lobe at one operation. He does not think the risk will be appreciably increased if this is done.

5. If a whole lobe is left behind it is probable that another operation will be necessary at a later time, unless by means of other treatment a sufficient reduction of the remaining lobe can be brought about.

ACUTE PURULENT INFECTIONS OF THE NOSE, THROAT, AND EAR.

HASTINGS in the *Journal of the American Medical Association* of December 2, 1916, in writing on this topic asserts that the public is not sufficiently aware of certain preventive measures, which may be briefly summarized as follows:

1. A daily cold bath. If the cold tub bath produces too much shock, a cold sponge bath about the face, neck, chest, and shoulders may be substituted.

2. Fresh, circulating air in the bedchamber. The sleeping porch accomplishes this result. The fad for outdoor sleeping, while in the main good, can be abused, for it is his experience that some people, particularly some children, are better off indoors, especially in cold, damp weather. The attempt to "harden" children who are susceptible to bronchitis and laryngitis, by forcing them to sleep outdoors in bad

weather, is especially to be condemned. Morse, in an instructive paper on the cold-air treatment in pneumonia cases, remarks that he has seen no ill effects from cold fresh-air treatment of patients with lobar pneumonia, but believes harm is done in pneumonia cases complicated by bronchitis. This has been the experience of laryngologists for a long time in regard to acute inflammations of the upper air tract.

3. Another preventive measure against "colds" is the avoidance of plunges, especially during epidemics of "colds." Plunges are contaminated at such times by the nasal secretion of those affected. The sanitary control of our college gymnasium and Y. M. C. A. plunges, various baths and athletic club plunges is a problem that is only of late being recognized. There is a wide-spread ignorance and complete indifference on the part of those in charge of them. A recent paper by Levine gives some facts on this subject, based on the examination of the swimming pool of the Iowa State College. Frequent changes of the water of a swimming pool, at least once a week, with periodic cleansing of the bottom and sides of the empty pool with ordinary lime bleach (calcium hypochlorite), is a safe measure. Where the cost of water is such that the water must be used again, Levine recommends that the water be pumped into a filtration plant, the empty tank cleansed, and the water be pumped back again, and disinfected in the tank by the use of copper sulphate, one part to a million. A bag containing the copper sulphate is drawn along the surface of the water until it is dissolved, a procedure that takes about fifteen minutes.

4. Another preventive measure against "colds" is the care in handling the nasal secretion of an infected member of the household. Handkerchiefs of cheese-cloth should be used as much as possible and burnt. In the early stage of a "cold" sneezing is not a harmless pleasure.

5. The use of vaccines, much lauded in various quarters to prevent "colds," has not proved of value in the experience of those qualified to pass judgment on this point.

WHAT TO DO WHEN THERE IS DISEASE OF THE LUNGS IN PREGNANCY.

In the *Long Island Medical Journal* for February, 1917, McGoldrick states that to arrive at the safest and best conclusion in any one case there is required the combined judgment of the clinician and skilled obstetrician, arrived at, not from a single examination and consultation, but after careful observation of the course of the disease in that individual. Urgent symptoms, such as persistent hemorrhage, cardiac embarrassment, and increasing dyspnea, may have an opinion-deciding influence of their own. Arbitrary rules of treatment are useless.

It must not be forgotten that many, many patients with active, though slight, lesions have successfully and repeatedly, as De Lee puts it, gone through their pregnancies and borne living children; that patients with quiescent lesions, aggravated by parturition, have later regained their former health; that some patients with far-advanced lung disease and suffering from mixed infection have gone to term and been restored to fairly good health; and that many more will be saved in proportion to the early recognition of the disease and the utilization of all the means to arrest it.

In this paper, necessarily condensed at the expense of many phases of this subject, McGoldrick emphasizes:

1. That tuberculosis associated with pregnancy, and because of that association, is often overlooked until it has passed the stage when most relief can be given.

2. That tuberculosis may have its inception (as usually called) or that an existing case may become aggravated during gestation, parturition, or puerperium, and that the period in which this occurs most frequently is the puerperium.

3. That the child born of a woman with advanced tuberculosis at the time of birth is not necessarily doomed to a short existence.

4. That of surgical measures, abortion (*i.e.*, in the first three months) has no indication as a remedial agent, and as a pro-

phylactic for further pulmonary disease is of great danger and little value; that the same ruling applies to miscarriage (*i.e.*, in the second three months); that, theoretically, in the last three months indications may exist for the induction of labor and rapid delivery with good results, but that practically these indications are rarely met—with the great exception that for the purpose of making labor easier the suggestion of Edgar that it be induced two weeks before the expected date should prove of much service; and, finally,

5. That continued care of the mother—following early diagnosis, under the best environment and possible circumstances, with the rapid cure of all the pregnancy toxemias, the shortened second stage of labor and the prevention of lactation—care continued postnatal, as well as prenatal—affords us the greatest hope at the present time.

THE TRANSFUSION OF BLOOD IN THE TREATMENT OF PERNICIOUS ANEMIA.

In the *St. Paul Medical Journal* for February, 1917, ARCHIBALD reaches these conclusions:

1. Sixty-nine per cent of the entire series of patients received marked immediate benefit from transfusion. In 50 per cent of the fourteen unfavorable cases the patients showed similar improvement. All except three were given the transfusions during the crisis, so that undoubtedly transfusion was the cause of the remissions.

2. In fifteen of the twenty-six cases, two or more transfusions were necessary. When no benefit is derived from one transfusion, a different donor should be tried.

3. Chronic cases with a history of remissions are the most likely to respond to transfusion. Other types of pernicious anemia may also respond. It is impossible to foretell the results of transfusion in any individual case.

4. The age of the patient up to the sixth decade has no effect on the results of transfusion.

5. When the blood is properly tested transfusion is practically free from danger. A slight reaction following transfusion is not necessarily indicative of improvement.

In discussing this paper Nadeau said Dr. Archibald has given an excellent report of the indications and results of blood transfusion in pernicious anemia. We will be interested in the technique of an indirect method of whole blood transfusion which has been used in some of the cases in the Mayo clinic. This method has been used by Dr. Percy at Augustana Hospital, Chicago, Ill., with uniformly excellent results since 1912.

A suitable donor is first tested by the Moss method of classification. It is sometimes difficult to find suitable donors, but they can usually be found among the patient's friends, professional donors being but rarely required.

Both donor and recipient are placed side by side in the operating-room and, under novocaine anesthesia, a small incision made over the median basilic or cephalic vein just above the elbow of each. The vein is dissected free and a fine catgut ligature is placed about one end, proximally in the donor and distally in the recipient. Temporary clamps are placed at the other end of the dissected vein and a small incision made between clamp and ligature, and the edges held open by means of small mosquito clamps.

A tube is used to carry the blood from donor to recipient. It is made of glass, is graduated, and has a total capacity of about 900 Cc. One end is drawn out into a cannula and the other end into a spout. The tube is sterilized and the entire inner surface covered with a thin layer of solid paraffin. A rubber tube is attached to the end opposite the cannula, to which are connected arrangements for suction and pressure of air within the glass tube. About 30 Cc. of sterile liquid paraffin is then drawn into the container. The cannula is inserted into the donor's vein and the required amount, usually 500 to 800 Cc. of blood, is withdrawn into the container, which is immediately transferred to the vein of the recipient and the contained

blood expressed into the recipient's circulation. It is a good rule to allow the first 50 Cc. to flow slowly and to watch the condition of the patient. Evidence of hemolysis is as evident after the mixing of small quantities as of large quantities of blood. If no untoward effects are perceivable, the remaining amount may be given in the space of from one to two minutes.

This apparatus is a modification of the Kimpton-Brown tube. The method has the advantage that whole blood touches nothing but paraffin, not even air, from the time it leaves the vein of the donor until it is injected into the recipient.

Whole blood transfusions are given in cases of secondary or pernicious anemia. In pernicious anemia, from one to five transfusions of 500 to 800 Cc. are given at periods varying from seven to ten days apart. When the patient's condition has improved to such an extent that an operation is safe, a splenectomy is done and is immediately followed by a blood transfusion. By this method many cases of pernicious anemia have been free of all remissions for as long a time as three years.

The first requisite is a thoroughly clean tube. It is washed well with hot water, followed by several changes of alcohol, several changes of ether, and, finally, air is blown through in order to remove the ether. This process leaves the tube clean and dry. One ounce of ordinary grocers' paraffin is next melted and drawn into the tube and allowed to harden. An assistant wearing sterile rubber gloves then heats the entire tube over a gas flame until the melted paraffin begins to smoke. This process both melts the paraffin and sterilizes the tube. It is then taken from the flame and rolled until cool, when a thin coat of paraffin will be left clinging to the entire inside of the tube. Care must be used not to clog the cannula with paraffin. Two ounces of ordinary sterile medicinal liquid paraffin is then drawn into the tube, which is now ready to use. The rubber tube connections are boiled fifteen minutes in order to sterilize them.

Dr. Archibald in closing said there is no permanent cure for pernicious anemia, and it is difficult to decide whether transfusion or splenectomy gives the more satisfactory temporary results. At the Mayo Clinic the results of splenectomy are the more prolonged in properly chosen cases; that is, there are more prolonged remissions in the greater percentage of cases. After transfusion there is no change in the amount of the destruction of the blood, whereas in splenectomy destruction decreases and the bone-marrow seems to be stimulated. This can be decided from Schneider's method of examining the duodenal contents. In the severe cases of pernicious anemia we find a great amount of urobilin and urobilinogen in the duodenal contents. After splenectomy these pigments are markedly decreased in amount and in many cases entirely disappear. They have determined the duodenal contents in a few cases after transfusion and have found no change. This has been the experience of others. In the transfusions done at the Mayo Clinic the sodium citrate method is employed. Into 50 Cc. of sodium citrate in a syringe 500 Cc. of blood is allowed to flow, making a mixture of 2-per-cent sodium citrate. It is very important that the percentage should not be below 2 per cent, for it has been found that severe reactions will occur.

DIGITALIS AND PNEUMONIA.

In the *Journal of Experimental Medicine* for January, 1917, COHN and JAMIESON make a report upon their employment of digitalis in the form of digipuratum in forty-nine cases of pneumonia, using fifty-six other cases, which received no digitalis, as controls. The drug was given by the mouth in the form of tablets, the dose usually being one and a half grains four times a day. The action of the drug was studied by the electrocardiograph. Cohn and Jamieson believe that the fever present in pneumonia does not interfere with the action of the drug, and that the intoxication due to the disease also does not interfere with its effects. They think it particularly useful where there is auricular irregularity.

[These conclusions are not in entire accord with the observations of many other clinicians as to effects of digitalis in fever and in infections.—ED.]

THE RELATION OF SO-CALLED ETHER PNEUMONIA TO PELVIC AND ABDOMINAL SURGERY.

In the *Medical Record* of November 11, 1916, DARNELL states that for many years it was commonly taught that ether irritated the bronchi and was largely the cause of what was known as postoperative pneumonia. Such pneumonia was spoken of, and still is in most hospitals, as "ether pneumonia." Yet any surgeon in reviewing his experience might find many facts to disprove, and few or no reasons to prove, that ether is the cause of pneumonia after an operation. Ether is administered in most hospitals many times every day, yet the condition known as ether pneumonia is a rare occurrence compared with the number of ether administrations given. If the pneumonia were the result of the ether, we ought to expect to have many cases every week. Again, if ether produced all the havoc it has been credited with, the administration of it by the intratracheal method might almost come under the classification of criminal malpractice. Yet we know that this is done safely every day. Rovsing had proved experimentally that although ether does occasion increased secretion of the salivary glands of the mouth, the larynx and trachea and the bronchi are not irritated at all, even when animals are killed by administering ether through a tracheotomy tube. The only way, therefore, that ether can produce pneumonia is by the aspiration of the accumulated saliva in the throat, usually the result of technical error on the part of the anesthetist, who should not allow the secretion to accumulate in the mouth. Such secretions may, of course, be easily infected from the buccal cavity. It was quite possible under such circumstances that tonsillar infections, involvement of the nasal accessory sinuses, or the teeth, might be one of the causes of postoperative pneumonia which has been attributed to ether.

Attention has frequently been called to the importance of the sanitation of the nose, throat, and mouth before all operations. If we looked on pneumonia after an abdominal operation in the same light as we do the development of a subphrenic abscess after an appendectomy, it will bear the same analogy as to the point of original infection. The only difference is that in the one case the new focus of infection landed above the diaphragm, and in the other beneath it, but both are brought about by the carrying of infection from the original source in the abdomen up through the lymphatics and veins by the retroperitoneal route. The idea was further strengthened by the fact that most postoperative pneumonias show a mixed infection containing streptococci, colon bacilli, or other organisms in addition to pneumococci. On the other hand, it is often true that the appendix, the gall-bladder, the Fallopian tubes, and the ovaries are the seat of a pneumococcus infection.

It would seem proper to conclude, therefore, that cases of pneumonia following operations were not due to the ether. The term "ether pneumonia" should be discarded and forgotten. Postoperative pneumonia occurs with great rarity except after abdominal operations, and is then probably due to an infection already existing in the bronchi or lungs at the time of operation, or to imperfect aeration and ventilation of the lungs, but most often such pneumonia is a secondary infection of the lung following a septic abdominal condition.

SCARLET FEVER.

In the *Boston Medical and Surgical Journal* of November 16, 1916, CHAPIN, who is Health Officer in Providence, R. I., states that scarlet fever is certainly infectious as soon as the first throat symptoms appear. The infectivity is at its height during the first days of the disease. In uncomplicated mild cases it soon begins to diminish. Many think that a large proportion of mild cases of scarlet fever are free from infection by

the end of the third week; doubtless, at times, even earlier. Unfortunately in many cases the infectivity is greatly prolonged. The experience of the London hospitals shows that five, or six, per cent of the cases are infectious for over six weeks. A few cases remain infectious for months. There seems to be a correlation between the complications and the duration of infectivity.

The infective material is certainly found in the throat secretions. The pathological condition also extends to the nose, as in diphtheria, giving rise to a nasal discharge, which is also infectious, as in the latter disease. So also is the aural discharge, but this is not so important. Nothing is known about the infectivity of the urine. There is a large amount of evidence that the exfoliated epidermis is not infectious. This can safely be disregarded in the release of patients. Patients should be isolated as long as there is any inflammation of the throat, any nasal or aural discharge. The latter may, however, at times be disregarded, especially if the ear is to receive proper treatment. The removal of tonsils and adenoids, if the operation is indicated, is believed by many to shorten the period of infectivity. After every precaution is taken, it will be found that a certain number of cases, apparently entirely normal, are yet infectious—that is, they are true convalescent carriers. For a mild, uncomplicated type of the disease, probably four weeks is a reasonable period of isolation. When the disease is more virulent, and there are many cases with complications, it is doubtless safer to prolong it a week or two.

The disease frequently presents a very mild type.. There are numerous cases with a slight sore throat, a very fleeting eruption, and scarcely any fever. Sometimes there is no eruption. They are doubtless true carriers—that is, persons infected but presenting no symptoms whatever; but our knowledge of these is limited. There is evidence that the number of mild, unrecognized cases is large, perhaps equal in number to the reported cases.

Scarlet fever is not especially contagious. It is less so than measles, whooping-cough, chicken-pox, or smallpox. It is spread almost exclusively by contact with the fresh secretions of the throat and nose. It is rarely, if ever, air-borne. Infection by fomites, as the term is ordinarily understood, is negligible. Infection almost never passes from one family to another in the same dwelling unless the families mingle.

Isolation of the case in the family is not very difficult. Too much should not be attempted. The most important matters only should be insisted on, otherwise complexity of detail will result in neglect. The patient, of course, must be kept in one room. One person only should act as a nurse. A wrapper, which is kept in the room, is to be worn if much is to be done about the patient. On leaving the patient, the hands must always be washed in hot soap and water and well rinsed, preferably in running water. As few dishes as possible should be used, and these should be scalded and washed by themselves. Soiled linen should be placed in a wash-boiler or dishpan kept in the room, and should afterward be boiled. It is preferable to have these procedures demonstrated by a nurse. It seems likely that frequent visits by a nurse during the course of the disease is the most effective means of securing proper care of the case and enforcement of rules. It is better than visits by doctors, or policemen, though the latter are sometimes needed.

Children in the family should not go to school. Those who are susceptible should be well isolated for a week. Later they may be allowed more freedom. Adults should not be seriously restricted. Milkmen and other food handlers should move away, also those who come in contact with children. Laborers, mechanics, clerks, and indeed most wage-earners, need not be kept from their occupation.

The most expensive means of isolation is the hospital, yet it is a necessity. There are a considerable number of persons who are so ignorant or careless, or who live under such bad conditions, that reasonable isolation at home cannot be secured. While

the proportion of wage-earners who should be kept from work is not large, keepers of small stores connected with the house, peddlers of fruit, candy, and ice cream, messengers and others, are apt to live so that home isolation is not practicable, but their loss of occupation would be a serious economic disaster. It is by no means necessary to attempt to provide hospital accommodations for from 90 to 95 per cent of the cases, as is done in England. Probably if 40 or 50 per cent of the cases most needing it could be removed to a hospital, the full value of the latter would be secured.

THE TREATMENT OF MERCURIAL STOMATITIS.

MONTGOMERY in the *Medical Record* of November 18, 1916, says that peroxide of hydrogen is now regarded as almost a specific in mercurial stomatitis. Nicholas mentions that it will often prevent its development, and frequently will cure one already under way. Scholtz says that as soon as the gums begin to swell and a purulent film appears, a very dilute perhydrol solution (1:500 or even 1:1000) constitutes the best mouth-wash. The question as between peroxide of hydrogen and perhydrol is an interesting one. Perhydrol is a 30-per-cent solution of peroxide of hydrogen, H_2O_2, and is free of acid. It therefore differs from the peroxide of hydrogen solution of the Pharmacopœia in being acid-free, and in being ten times stronger. The addition, however, of a very small quantity of acetanilide stabilizes the H_2O_2 and enables it to be made so slightly acid as not to be hurtful, so that the difference between the two preparations, when carefully made, is reduced to a matter of strength, and as they are almost always employed highly diluted in stomatitis mercurialis this difference may also be equalized. Perhydrol has the disadvantages of being expensive and being liable to explode. Expense under the circumstances is a matter of importance, as the free use of the mouth-wash is essential.

Scholtz employs the following prescription:

℞ Sol. perhydroli, 5.00;
Aq. ad, 200.00.

M. Sig.: A teaspoonful in a half or a full glass of water as a mouth-wash several times a day.

As peroxide of hydrogen is one-tenth the strength of perhydrol an equivalent prescription would be:

Peroxide of hydrogen, 50.00:
Aq. ad, 200.00.

Sig.: A teaspoonful in a half or a full glass of water.

This is slightly astringent and antiseptic, it cleans the mouth and gums, and dissolves and scatters the mucopurulent coating, and therefore deprives the anaerobic bacteria of their food. As occasion requires, this solution may be employed stronger.

In cases in which the margin of the gums is still more strongly affected, as in pyorrhea alveolaris, undiluted peroxide of hydrogen may be directly applied, or a mixture of equal parts of peroxide and a 20-per-cent solution of nitrate of silver:

℞ Peroxide of hydrogen,
Argent. nitric. (20-per-cent sol.), ää 10.00.

M. Sig.: Apply with a cotton swab.

Both chlorate of potassium and peroxide of hydrogen, the two remedies found so excellent in mercurial stomatitis, give off their oxygen very readily, and it may be presumed that it is to this circumstance that they, in a great measure, owe their effect in interfering with the activity of the anaerobic bacteria. [Do not mix chlorate of potassium and peroxide.—ED.]

Liquid alumini acetatis, a teaspoonful or less in a glass of water, makes an excellent mouth-wash and gargle.

There are several good mouth-washes on the market of the same general formula as the liquor alkalinis antisepticus. A principal ingredient of these is borax, a mild antiseptic of an unctuous, soothing nature. Boric acid may be used advantageously, dissolved in water, a heaping teaspoonful in a glass. Years ago Montgomery ran across a recommendation by Louis Brocq of adding boric acid powder to slippery-elm bark tea, which makes a particularly smooth, simple, mildly antiseptic preparation in irritative lesions of the mouth. First

the infusion is made by putting a handful of the bark in a moderate sized pitcher and adding hot water. After standing for some time the tea may be poured out through gauze. A heaping tablespoonful of boric acid powder may be added to a quart bottle of this infusion. If this is more than sufficient to dissolve, the residuum sinks to the bottom of the bottle, and in any case can do no harm. The patient may carry a quantity of this in a flat bottle in his hip pocket for frequent use. Every author insists on the frequent employment of these mouth-washes as being of the utmost comfort to the patient, and it is one of the chief advantages of the acetate of aluminum, boric acid, and very dilute peroxide of hydrogen mouth-washes that they can be so employed, without either inconvenience or financial embarrassment.

Chromic acid, in 10-per-cent solution, is the best application for erosions. It must, however, not be used too frequently, as in that case it will irritate an already irritable condition. A swabbing every two or three days is usually much better than a daily application. Nitrate of silver in 10-per-cent solution, or as the stick, may also be used in the same way, but usually does not act so kindly. When the gums are very soft and swollen, it is best to brush them with a 10- or 20-per-cent solution of nitrate of silver followed immediately by a 10-per-cent solution of chromic acid (Scholtz).

Chromic acid may be used in yet another way when ulceration occurs. A 25-per-cent solution is brushed over the surface, followed by the application of nitrate of silver stick (Boeck). A combination of red chrome silver is formed as a crust, under which healing takes place. In larger ulcerations iodoform gauze may have to be laid between the gums and the cheeks. Montgomery has never had to employ either of these expedients, but no man can say when he will have to do so, as in giving mercury hypodermically the dose is irretrievable, and the patient may be hypersensitive to the drug. Furthermore it is well known that the most severe cases of stomatitis may occur with the inunction treatment. The two effective ways of administering mercury, therefore, are intimately linked with a possible severe stomatitis.

Tincture of rhatania, tincture of nutgalls (gallarum), and tincture of myrrh are employed for their astringent effect. They are, however, of less value than those previously mentioned, but may be very useful when the gums are in good order.

℞ Tr. rhataniæ,
Tr. gallarum, ää 15.00.

M. Sig.: Fifteen to twenty drops in a half-glass of water as a mouth-wash.

The elimination of an offending substance must be fundamentally more important than the control of the symptoms it produces. This axiom holds as good for mercury, causing a severe stomatitis, as for any other foreign body. The first step to be taken, therefore, is to stop the drug, and if inunctions have been employed, to give a hot bath with plenty of soap to free the skin of the mercurial ointment. Some would add Vlemingkx's solution to this bath in order that the inert black sulphide of mercury may be formed. The essential, however, is the water, the soap, and the scrubbing to free the skin of the mercury, and so to stop absorption and inhalation.

Formerly the impure sulphuret of potassium, called "liver of sulphur," was much used for sulphur baths, but now Vlemingkx's solution is generally preferred. This solution is made by adding quicklime to sulphur and boiling it down:

℞ Sulphuris sublimati, ℥v;
Calcis vivæ, ʒxx;
Aq., ℥l.

Boil together with constant stirring until the mixture measures ounces xxx. This is sufficient for about five baths.

One hundred and fifty to two hundred grammes, or five or six ounces, are added to the bath. The two disagreeable features of this bath are its evil odor and the way it blackens a metal bath-tub. The advantage to be reaped in fixing the metal mercury as the black sulphide is very small, as all the metal attainable on the surface can be removed by a bath of soap and hot water.

The rate of the elimination of mercury varies greatly in different cases, and the reasons for the variability are usually unascertainable. There seems to be no doubt that the chief emunctory is the intestinal canal. Vogel and Lee, for instance, recently have found that, in cases of bichloride of mercury poisoning, the mercury persisted longer in the feces than in either the stomach washings or in the urine.

The next measure, therefore, after stopping the drug, is to see that the bowels are acting properly. A dose of castor oil may be given as the best cleanser of the alimentary tract, and this should be followed by a steadily acting laxative, such as senna or rhubarb, which may be advantageously combined with a diuretic:

℞ Pot. acetatis, drachm v;
Ext. sennæ fl., ounce ij;
Aq. gaultheriæ ad., ounce iv.

M. Sig.: A teaspoonful in a little water p. c. t. i. d.

To give a diuretic and not to give abundance of water is like putting a mill-wheel in a dry mill-race. The patient, therefore, should be advised to take warm drinks in plenty. The value of the various teas rests probably in the fact that many people cannot take plain warm water without nausea. These teas set the skin as well as the kidneys in action, and if to this ingestion of hot water there is added a hot bath with a subsequent rest in bed of two hours to encourage perspiration, much will be accomplished.

Here may be mentioned the administration of atropine as a hypocrinic. A hypocrinic is a drug that lowers the secretory activity of a gland, and for this purpose the use of belladonna and atropine has been advised to control the tormenting salivation. If, however, these drugs are given to lower the activity of one set of glands, they just as surely lower activity in others, and therefore interfere with the intestinal, renal, and cutaneous elimination of mercury. Furthermore, the effect of these drugs on the salivary glands is apt to be very little, whereas their general effect on the entire secretory system may be quite pronounced, and therefore more harm than good may easily be accomplished by their employment. All the other hypocrinic or inhibitory drugs are in the same category. Many men, for instance, prescribe opium with mercury as a routine practice in giving mercury by the mouth, with the double purpose of preventing a diarrhea and of allowing the mercury to accumulate in the body. It is not, however, the mercury that accumulates in the body that does the good, it is that that actively changes into a form noxious to the spirochete and then passes through, carrying with it the peccant materials. The action is, therefore, spirocheticidal and eliminatory, and any interference with elimination is detrimental both in the treatment of spyhilis and in any of the accidents produced by mercury.

In reflecting on the phenomena of mercurial stomatitis one cannot fail to be struck with their intimate connection with the teeth. Sensitiveness of the teeth is one of the first symptoms; the trouble is most apt to begin in the neighborhood of the teeth; the condition of the teeth is of the first importance in the incidence of the symptoms; absence of the teeth secures a comparative immunity; and the treatment is largely directed toward the care of the teeth and gums.

TREATMENT OF CARRIERS OF AMEBIC DYSENTERY.

The *British Medical Journal* of November 4, 1916, points out that attention has frequently been drawn to the importance of the problem presented by chronic carriers of entamœba histolytica, owing to the fact that this form of infection, whether following an acute attack of dysentery or discovered apart from any history of dysenteric symptoms, has, in a considerable proportion of cases, proved resistant to treatment by the hypodermic injection of emetine, which has been found so efficacious in acute dysentery by all who have used it since Sir Leonard Rogers published his first papers on the subject in the *British Medical Journal* on June 22 and August 24, 1912. The paper by Sir Clifford Dobell affords evidence of the frequency with

which contact carriers, as well as convalescent carriers, occur among those who have been exposed to infection in an endemic area, and fully confirms the fact that the ordinary treatment by the hypodermic injection of emetine often fails to free such persons from infection. Just two years ago Du Mez, of the school of pharmacy of the University of the Philippines, suggested the use of a double salt of emetine and bismuth—emetine bismuthous iodide—and gave an account of its mode of preparation and constitution.

It is a brick-red powder, insoluble in water, or water acidulated with hydrochloric acid, and stable in air. According to Du Mez's calculations it contains 58 per cent iodine and 12 per cent bismuth, with 29 per cent emetine. Insoluble salts of bismuth are converted into bismuth sulphide after passing the pylorus, and in all probability the reaction is very slow, taking place as the compound is spread out over the wall of the intestines. Three grains of the double salt, containing about 1 grain of emetine, seems to be a good average daily dose, and twelve such doses may be given in succession. In the recent trials of the drug recorded by Mr. Dobell the double salt was given in cachets containing one grain each, until 36 grains had been taken. Vomiting, if it occurred, usually did not come on until some time after the dose had been taken, indicating probably absorption from the intestine and not from the stomach. It is recommended that the dose should be given after a full meal, when the stomach contents will be certainly acid, and on the whole the drug was well tolerated. Lieutenant Matthews, who had clinical charge of the cases, stated that he has found it best to persist with it in full doses, as tolerance is usually established in a couble of days, and more quickly than if the dose is reduced on account of the vomiting.

Mr. Dobell gives an account of a systematic investigation of this double salt used in a military hospital in the hope of freeing carriers of the infection. The investigation has had the enthusiastic coöperation of the hospital staff, and the laboratory work has been carried out with the thoroughness to be expected from a protozoölogist of his authority. The conclusion to be drawn is that, making all allowance for uncertainties, due to the limit set to observation by practical considerations, there seems no room for doubt that an advantage is to be gained by administering emetine in the form of this double iodide in these chronic cases of amebic infection. Other reports on isolated cases and some interim accounts of further systematic trials have come to hand; and on the whole the results are similar to those recorded by Mr. Dobell. There have, indeed, been groups of cases showing less completely favorable results. Inquiry into some such cases raised a doubt as to whether the patients had really taken the drug; in others the full course had certainly not been given; but when due allowance is made for these sources of error it has to be admitted that a residuum of apparent failures remain. There is, however, no evidence from any source to weaken the conviction that the chance of curing a carrier of entamœba histolytica with the double iodide is very much greater than with emetine given as any other salt or as ipecacuanha. The curative results have, indeed, been far beyond the original expectation.

On the other hand, the hope that the relative insolubility of the double iodide would prevent vomiting, which was so tiresome a complication of the old ipecacuanha treatment, has not been altogether fulfilled. The vomiting has, in not a few cases, been troublesome; and it would appear that some medical officers have been so discouraged by it as to abandon the treatment. It may be suggested that they exaggerate the importance of an admittedly unpleasant symptom; for those who have persisted in spite of it report, with remarkable unanimity, that in most cases the patient becomes tolerant after a dose or two, and that the improvement the treatment effects in the general health is as striking as, and doubtless dependent on, the disappearance of the amebic infection. Some detail of admin-

istration may, it is hoped, soon be discovered which will remove the difficulty due to nausea and vomiting. Meanwhile, it may be hinted that this effect of the double iodide, as now given, causes in some patients a natural reluctance to swallow the dose, and imposes a special duty on the medical officer, who desires to cure his cases, of seeing that it is actually taken. Cases have been reported in which keeping the men in bed during the treatment, instead of handing them the dose and allowing them to leave the hospital building, has improved the results in a significant manner. It is to be hoped that a relatively trivial drawback will not be allowed to obscure the duty of using every available means for rendering those who have had the misfortune to acquire a chronic infection with entamœba histolytica free from the danger which this condition entails on themselves and on others, more especially under the conditions of hardship and improvised sanitation inseparable from a military campaign.

It is not to be expected that experience from all centers will show so complete a success with emetine bismuthous iodide as that which Mr. Dobell's paper records. But the resources of treatment are not exhausted when it fails. Some favorable reports have been made of a combined treatment with emetine hypodermically and ipecacuanha by the mouth; it seems likely that replacement of ipecacuanha by the double iodide in this combination might be even more effective. There are remedies again, such as the Chapparo amargosa of Texas, of which favorable reports come from America, especially for cases of the semiacute type which have resisted emetine. If the magnitude and importance of the problem created by these carriers are kept clearly in view, and the duty grasped of doing all that is possible to restore them to health and safety before they become distributed into civil life and lost to observation, a satisfactory solution should not be beyond reach.

It should be noted that treatment by emetine bismuthous iodide is useless in infections by Lamblia and Chilomastix, and that, as a rule, entamœba coli, which is believed to be a harmless parasite, though it disappears during treatment, almost invariably reappears afterward.

SOME STUDIES OF THEOCIN.

In the *Archives of Internal Medicine* of November 15, 1916, CHRISTIAN states that a fairly complete study of a small group of patients with acute nephritis or cardiorenal disease indicates that theocin in patients with slight or no edema has little or no therapeutic value, inasmuch as diuresis is not constantly produced, elimination of nitrogenous substances quite often is slightly if at all increased, and renal function is frequently decreased after giving theocin. In cardiorenal cases with marked edema theocin is of therapeutic value, because it produces, especially in conjunction with digitalis, an active diuresis with increased sodium chloride elimination, which decreases edema, a troublesome feature in these cases. Inasmuch as there is evidence that following an active diuresis renal function is depressed, an intermittent usage of theocin seems preferable to a continuous usage in cardiorenal cases with edema.

A REPORT OF THE USE OF STOCK VACCINE IN INFECTION BY THE BACILLUS TYPHOSUS, WITH AN ANALYSIS OF TWO HUNDRED AND THIRTY CASES.

In the *Journal of the Royal Medical Corps* for October, 1916, WHITTINGTON makes a useful report on this subject. He states that in the total vaccinated cases there were twenty-nine in which it appeared that vaccine had a definite good influence. Of these, twenty belonged to Classes 3 and 4—*i.e.*, to those classes in which the prognosis is good. In other words, "good results" are more often obtained where good results can be expected by ordinary methods of treatment alone. On the other hand, the mortality rate and the average length of fever in these classes was slightly worse among the cases which had vaccine.

Among the cases belonging to Classes 1 and 2, in which the vaccine appeared to do good, none had severe lung involvement. Those cases which had much bronchitis or bronchopneumonia (the average severe case) ran the severe course which is usual, and vaccine appeared to be of no avail. To say that if the average severity of the cases treated had been less the vaccine would have had better results is merely to say, Whittington thinks, that the cases would then have done better anyhow. From all this it would appear: (*a*) That it is in just those cases in which the physician so much requires help that vaccine is so disappointing; (*b*) that vaccine neither shortens nor reduces the number of complications in even that class of case which is likely to do well; (*c*) that there is a decided suspicion that vaccine increases the incidence of hemorrhage.

The conclusion, therefore, is that the use of a stock vaccine in typhoid fever cannot be recommended as a routine treatment. Whittington would add that these conclusions are largely contrary to the impressions which he received during the treatment of the earlier cases. He had not then seen a sufficient number of similar cases which did well without vaccine, and being rather biased in its favor, he gave undeserved credit to this treatment.

THE TREATMENT OF DIABETES MELLITUS BY PROLONGED FASTING.

CAMMIDGE in the *Practitioner* for November, 1916, writes on this theme. He points out that Allen and other observers found that, when nine-tenths or more of the pancreas is removed, an acute form of diabetes supervenes at once, but that when only seven-eighths or sometimes less of the gland is excised the onset is gradual, with longer or shorter periods of slight or intermittent glycosuria. Allen showed that dogs thus rendered diabetic could be kept for months, and apparently for years, in the best of health provided they were given a diet within their limit of tolerance. If this limit were exceeded, a permanent and fatal diabetes ensued. Individual idiosyncrasies, differences in the permeability of the kidneys to sugar, and effects of nervous influences on the glycosuria, similar to those met with in human diabetes, were noticed as well. In the light of his experience with animals, Allen came to the conclusion that the cure of diabetes in man is possible and feasible, a position he maintained in a paper published in 1914, in which he outlined his proposed new plan of treatment.

Allen assumed that interference with the internal functions of the pancreas is the essential factor in all cases of diabetes, and that the condition is comparable to that existing in animals after partial resection of the gland, there being a loss of some of the glandular substance and a functional disturbance of the remainder in both. The structural deficiencies, whether due to surgical interference, as in animals, or to disease, as in man, cannot of course be made good, but since experiment has shown that the disturbance of function following operation in dogs subsides, and the power to metabolize more or less carbohydrate is restored, if a sufficiently long period of physiological rest is given, similar enforced rest of the damaged structures in the human subject may be expected to control the merely functional disturbances and bring about improved carbohydrate tolerance. As the necessary physiological rest can only be obtained by abstinence from food, fasting must be enforced until the total disappearance of glycosuria and hyperglycemia shows that the functional capacity of the pancreas is sufficiently restored to permit of complete utilization of the sugar formed by the patient from his own body protein.

Recent observations carried out by Allen and Du Bois in the respiration calorimeter suggest that this power may be acquired even in severe cases of diabetes as a result of fasting, and that later they are able to metabolize the sugar derived from the protein and carbohydrate of a carefully regulated diet also. The starvation naturally causes a loss of weight, but Allen main-

tains that this need cause no alarm, for, broadly speaking, freedom from glycosuria is attainable in all uncomplicated cases of diabetes before there is danger of death from starvation. Moreover, one of the aims of the treatment is to make the patient a physiological fit for his pancreas, which necessitates more or less reduction in the bulk of the body, according to the extent of the permanent injury sustained by the gland. When examination of the urine shows that it has been free from sugar for twenty-four hours feeding is commenced, but with a carefully selected and graduated diet, arranged so as to test the patient's tolerance for all the three chief food materials—carbohydrates, proteins, and fats —while avoiding overfeeding, and thus maintaining the freedom from glycosuria. No attempt is made to increase the weight; in fact, any gain that brings back sugar in the urine is immediately checked by a further fast, which is continued until the urine is again sugar-free.

Contrary to what might be expected from past experience, this method of treatment is not contraindicated by the presence of oxybutyric acid and acetone bodies in the urine. The increase in the acidosis, which occurs at first, generally subsides later if the starvation is persevered with, and eventually oxybutyric acid and excess of acetone bodies disappear in the majority of cases. The danger of coma is correspondingly reduced, and, as a rule, the administration of objectionable alkalies can be dispensed with at an early stage of the treatment. In order that the tendency to an excessive formation of acetone bodies, etc., may be kept under control when feeding is resumed, the fat content of the diet is maintained at a low level until a fair tolerance for carbohydrate has been established.

It is necessary that the principles of Allen's method should be thoroughly understood if full advantage is to be taken of his work, otherwise attempts to apply it in practice may meet with failure, which is likely to be attributed unjustly to defects in the method. Education of the patient is always an important part of any form of diabetic treatment, and is here essential. In order that his intelligent cooperation may be gained, the aims of the treatment and the means by which they are attained should be clearly explained, and he should be instructed subsequently in the more important points concerning the properties and functions of different classes of food materials. Since the misplaced sympathy of relatives and friends often has a disturbing influence, the treatment generally answers best when carried out in a nursing home or institution away from such influences.

When Cammidge commenced using Allen's method, he kept all his patients in bed, but he finds that many do better when they are allowed to get about and occupy themselves. A brisk purge at the beginning of the fast tends to diminish the sense of hunger, and prevents the headache of which some complain. Plenty of water or soda water is also helpful. Black coffee and weak China tea in limited quantities spread over the day, are grateful and comforting, but in most cases it is advisable to avoid cream, for it often tends to prolong the fast unnecessarily, and may increase the tendency to acidosis. If the fast lasts more than a couple of days, he gives an ounce or two of bovril, made up to half a pint or a pint with hot water. He prefers bovril to beef tea or soup, for its composition is more constant. If there is serious acidosis, about 1 Cc. of whisky per kilogramme of body weight, in divided doses during the day, is advisable, but the average case seems to do better without alcohol. Occasionally one meets with a patient who reacts badly to starvation, complaining of nausea, sickness, and general prostration, or it may be that the condition of the heart and the blood-pressure, which should be carefully watched, contraindicate a fast sufficiently prolonged to remove entirely the glycosuria and hyperglycemia. If in such a case it is decided that fasting is the best treatment, it is advisable to terminate

the starvation temporarily, give a restricted diet for a week or two, and then try a further period.

THE USE OF MALT SOUP EXTRACT IN INFANT FEEDING.

In the *Journal of the American Medical Association* of November 11, 1916, HOOBLER in discussing the value of malt soup in infant feeding expresses the view that in order to clear the field of confusion and to save such an excellent food product from being wrongly employed, there should be a variety of methods devised for its use, depending on the results one wishes to accomplish. It is evident that any food made up according to one specific invariable rule is certain sooner or later to prove unsatisfactory in many cases.

The following is the formula usually printed on the container of one malt soup extract:

DIRECTIONS FOR PREPARING MALT SOUP.

Make two mixtures as follows:

Mixture 1. Take 3½ ounces by weight (or 2½ ounces by measure) of malt soup extract and dissolve in 22 ounces of warm water.

Mixture 2. Take 1¾ ounces by weight (or 2¾ ounces by measure) of wheat flour; mix with 11 ounces of milk and strain through a sieve.

Add Mixture 2 to Mixture 1 and boil three minutes, stirring constantly. Cool quickly and pour into clean bottles holding 6 ounces. Plug them tightly with absorbent cotton, or if corks are used they should be absolutely clean and close fitting.

Keep in a cool place.

We have in malt soup a mixture of boiled whole milk, raw wheat starch, malt soup extract, water, and an alkali in the form of potassium carbonate. We are asked to use this food designed by Keller for the treatment of enteritis cases and in other conditions without varying the formula. It is only natural that there should be many failures; the failures, however, should not be wholly charged to malt soup extract, but should, in Hoobler's opinion, be charged to the method of preparation.

It seems to him that von Liebig's original use of malt soup for the nutrition of normal infants, particularly those infants whose weight is at a standstill and whose bowels tend to be constipated, offers a much greater field for the use of this excellent food product. When used in such cases, it has been Hoobler's custom to vary the Keller formula for the following reasons:

1. Boiled milk to his mind should not be given over long periods of time to children with a tendency to constipation.

2. Raw starch, or any starch cooked only from three to five minutes, should not be given to any infant, as it causes marked indigestion in many cases.

3. He does not think the proportion of one-third whole milk and two-thirds cereal water is the correct proportion in every case in which malt soup extract is indicated.

4. The use of the full quantity (3½ ounces by weight to 1 quart) of malt soup extract is too arbitrary a quantity. This amount will often cause an infant to have too many watery stools, producing marked fall in weight due to water loss.

5. The use of the alkali (potassium carbonate) is to his mind far more indicated in a formula designed for the correction of constipation than for diarrhea, since it has been shown by Dr. Holt that loose stools contain a larger proportion of potassium and sodium than constipated stools; hence in attempting to change a hard formed constipated stool to a soft loose stool, the use of potassium and sodium in the food are indicated. From the fact that in loose stools there is a much lower proportion of calcium than in constipated stools, it would seem on theoretical grounds that when one desired to use malt soup extract in conditions in which there are loose stools, the use of calcium would be more indicated than the alkali potassium or sodium. However, the presence of the alkali potassium is theoretically the proper form of the alkali in conditions in which stools tend toward constipation, and this is confirmed by clinical observation.

The method of using the malt soup extract which has been most satisfactory in

Hoobler's experience is one which gives much greater flexibility in the use of the various ingredients than can be obtained in following Keller's formula. This may be accomplished by adding the malt soup extract to a well-cooked cereal water, and this mixture added to raw milk in such proportions as one wishes.

1. Make up 1 quart of cereal water, using such quantity and kind of cereal flour as may be indicated. (The cereal water is to be cooked at least one hour in a double boiler.) When sufficiently cooked, and while still hot, add two level tablespoonfuls of malt soup extract. Stir until dissolved. Strain.

2. Select the kind of milk which it is desired to feed, and measure off the number of ounces of the milk which are to be fed during the twenty-four hours. (This will vary according to the age, weight, and condition of the infant.) Add to the milk as much of the cereal-malt soup extract as is required to make up the quantity to be fed in twenty-four hours. Add to this such amount and kind of sugar as may be indicated.

This formula serves for the first two or three days, and is in the form of a trial formula. If the child retains it and the stools become more frequent and softer, and there is a gain in weight, this formula may be continued. If the child retains it and there is no change in stools or weight, then gradually increase the malt soup extract. With each increase of malt soup extract one should withdraw an equal amount of the added sugar, provided one is near the carbohydrate limit, which, of course, varies in different children. By using this method of preparation one is at liberty to vary the amount and kind of cereal water used. The use of so much wheat flour cooked for such a short time is, in Hoobler's opinion, responsible for many failures in the use of malt soup. The wheat flour was added in the original formula of Keller for its constipating effect, as it was found when malt soup extract was used alone it was too laxative. In the choice of the cereal flour used in connection with malt soup extract, one should be guided by the effect which it is desired to produce. If a marked laxative effect, then one type; if a constipating effect, then another; if intermediate, then still another group.

ACIDOSIS OF GASTROINTESTINAL ORIGIN.

In the *Journal of the American Medical Association* of November 4, 1916, CHAPIN and PEASE present statements in support of their idea that acidosis may result from the split products of proteins. They cite Vaughan, who, in a recent communication, has shown that casein yields a large percentage of the protein poison, and that this poison is in and of itself strongly acid. In animals, at least, it is entirely capable of causing acute or chronic poisoning when administered by the mouth, in the latter instance resulting in extensive fatty degeneration of the tissues. There is a tendency for the protein poison of the casein to combine with certain unbroken proteins, so that its physiologic action is diminished and its acidity wholly or in part neutralized. It is interesting to note that these poisons which are consequent on the splitting of casein are capable of giving a skin reaction in all persons to whom they are administered. Chapin and Pease found in the research of Vaughan an interesting support of their theory arrived at from clinical observations that acidosis of gastrointestinal origin is probably always closely connected with the proteins, and especially with the casein of milk. They have long believed, and, as their observations have become more extensive, this belief has changed to a practical certainty, that high protein feeding is not without its dangers and under certain conditions may become an actual menace to life itself.

If the proteins or the products of the breaking down of proteins form the etiologic factor in acidosis, recurrence of this condition might naturally be looked for.

Recurrences are not only observed so

near the first attack as to suggest the probability of a relapse, but are also seen over a period of weeks and months in a form which often suggests recurrent vomiting. In private practice they have had three patients who have suffered from cyclic vomiting for more than three years whose initial attack was diagnosed as intestinal intoxication, and who they now know suffered from acidosis. These children had previously been well and able to care for any kind of food. At times the intolerance for milk after such an attack is so great as to suggest an idiosyncrasy or an actual anaphylaxis for milk. It would seem that this intolerance for milk is due to the protein rather than to the sugar or fats of the milk. There was certainly no apparent advantage in giving sugar or fat-free milk. Whey was tried on only one occasion, for the result was such as not to be a temptation for further investigation. They should hesitate to assert that sugar was a cause of acidosis in view of the fact that of late a regular part of their treatment has been the use of glucose and thick gruels of barley, farina, and oatmeal.

The suggestion that the etiologic factor of acidosis is to be found in the decomposition of proteins is supported in an interesting manner by the frequent finding of large amounts of indican in the urine. Indican was not invariably present, but when found was often in very large amounts. They also discovered that commonly it was a rather transient finding, being found on one day and absent or nearly so on the next.

Having noted that these children improved rapidly if they lived for a sufficient length of time for a cathartic to act, Chapin and Pease were tempted to see what starvation would do. It was, however, with a considerable degree of hesitation that they instituted this measure, for they were familiar with the fact that mere starvation could be the cause of a very rapid increase of abnormal acids. Perhaps, somewhat contrary to their expectations, they have often noted a remarkably prompt improvement to follow on a period when nothing but water and a solution of sodium bicarbonate was given. They have seen the stupor disappear and respirations fall almost to normal over night with this simple treatment. They do not consider that this improvement was entirely due to the sodium bicarbonate, for under other conditions of feeding recovery, if it took place at all, was much slower.

A very important part of their treatment has been a thorough cleaning out of the bowels, and especially of the small intestine. High colon irrigations and stomach washing did not accomplish much improvement if their efforts ceased at this point. Nearly always such a catharsis resulted in a very nasty, foul-smelling stool.

The use of sodium bicarbonate is to be recommended as a valuable temporary measure. It has much the same relation to acidosis that the cold pack has to temperature. It serves to keep the patient alive until other measures which require time become effective. It should be pushed until the reaction of the urine is alkaline or the blood shows a normal reaction. They have made it a practice to give the sodium bicarbonate in every possible way—by stomach, by the colon, subcutaneously, and intravenously—as the urgency of the symptoms seemed to indicate.

As they have tentatively connected attacks of acidosis with the milk—and perhaps most frequently with milk which contains an unduly high bacterial count—a very essential part of their treatment has been the elimination of milk from the diet for a considerable period of time. Their most successful cases have been those in which they have made a very slow return to the proteins. To an extent they have made vegetable proteins take the place of animal proteins; accordingly these children have been given thick gruels which were cooked for many hours. With the addition of sugar as the symptoms seemed to warrant, the caloric requirements for a time at least can be met.

The mortality rate among children suffering from an attack of acidosis is so great

as to make it a condition which should demand not only our interest but also our earnest investigation into its cause and treatment. They have suggested the close relation of acidosis to the milk supply, and especially to the decomposition products of the proteins of milk. They have outlined a method of treatment which is more satisfactory than any that they have previously employed, and which is based on the assumption of the close relationship of milk and this type of acidosis.

VALUE OF VACCINE THERAPY IN THE TREATMENT OF GUNSHOT WOUNDS.

SWAN (*Lancet*, Nov. 18, 1916) began vaccine treatment with some skepticism, but was convinced of its value as to clinical results. The large majority of infections are by bacilli of the colon or proteus group, pyogenic cocci, and anaerobic gas-forming organisms. The admixture of the proteus and the cocci paves the way for the anaerobe to invade the tissues in the immediate proximity of the wound and causes the breaking up of the muscle tissue and the partial digestion which is now recognized in these wounds. Swan has had a large number of his cases treated with the mixed vaccine of proteus and streptococcus, and has found this method of great assistance to the other methods of treatment carried out on ordinary surgical lines.

Bacterial examination should be made of both the superficial and deep aspects of the wound, for often in the latter are found the only indications of anaerobic activity. Where operation is practiced before vaccines are given there is usually pronounced pyrexia for one or two days. Vaccines prevent this. As a rule no operation should be performed without the knowledge of the interior of the wound afforded by a thorough radiographic examination, particularly as regards bone injury. Whilst this is being done an attempt to immunize the patient against the proteus and streptococcal infection should be made. The vaccination therapy is particularly valuable in the treatment of complicated septic fractures of long bones and of fractures which open into joint cavities. These cases are treated by freely opening the wounds to secure adequate drainage, approximating the fragments and only removing those fragments which are undoubtedly completely separated. If needful, under vaccination displaced bones may be secured in place by silver wire or even bone plates, and this in the presence of local sepsis. In treatment of septic gunshot fractures which involve large joints, vaccine therapy holds an important place. Excision after vaccination is followed by prompt recovery and a movable false joint. These cases are also singularly free from secondary hemorrhage, due possibly to arrest of the digestive action in the tissues of the anaerobic coexisting infection.

STUDIES IN CEREBRAL FAT EMBOLISM WITH REFERENCE TO THE PATHOLOGY OF DELIRIUM AND COMA.

In a previous study of the tissues of fourteen persons who died following fractures complicated by fat embolism, an attempt was made to correlate the amount of fat present in the blood-vessels of the various organs, demonstrable by histologic methods, with the severity of the symptoms noted clinically, and the frequency with which the delirium occurring after fractures was ascribed to alcoholism was emphasized. In eight of the fourteen cases delirium tremens had been diagnosed clinically, although histories of alcoholism had not been definitely established in all the cases. The study was made on the bodies coming to necropsy from the Cook County and Presbyterian hospitals, Chicago.

Preparation of the tissues for the purpose of accurate estimation of the fat content is given in detail. Of each piece of tissue 50 sections were examined, and of these five sections containing average amounts of fat emboli were set aside for comparison. When these were collected they were carefully examined, and the amount of fat in ten fields of each organ was compared to the amount in ten fields of

the same organ of Case A, which was regarded as containing 100 per cent. Then the percentages of fat emboli in the several organs of each body were averaged and compared to Case A. The result was that the other thirteen bodies were found to contain 5 to 45 per cent of fat emboli in the organs. The fat emboli were most numerous in the lungs. In addition to the presence of fat emboli, there were certain circulatory alterations, as edema and hemorrhages, besides fatty changes of some of the organs. Edema of the brain was observed in seven; fat droplets in the blood stream noted at the time of necropsy in six; petechial hemorrhages, also noted at the time of necropsy, in the skin or organs in nine. In the lungs of all the bodies there were large numbers of fat emboli, and in half there were microscopic hemorrhages. In the heart muscle of 13 bodies there were fat emboli, microscopic hemorrhages in 12, and fatty degeneration in 6. In the kidneys of all 14 bodies there were fat emboli, fatty degeneration in 13, and microscopic hemorrhages in 10. In but six of the livers were emboli found, while in 12 there was venous engorgement and fatty infiltration, the latter being marked in seven. Fat emboli were also found in the brain, suprarenal, gastric mucosa, testis, and spleen in several instances.

The pathology of delirium and coma, the author states, has not been definitely established. From the data in the literature, there is evidence indicating that they may be caused by a variety of anatomical lesions in addition to those mentioned. Hoch has studied the brain of a man dying of delirium tremens and finds alterations in the pyramidal cells of the cortex cerebri, no mention being made of alterations of fiber tracts or evidence of focal necrosis.

In view of the profound disturbance in the central nervous system produced by the secondary changes of fat embolism, the author believes it is reasonably safe to conclude that these multiple lesions are intimately associated with the clinical manifestations of delirium and coma.—*Surgery, Gynecology and Obstetrics,* December, 1916.

VALUE OF LUMBAR PUNCTURE IN WAR WOUNDS OF THE SKULL.

LERICHE (*Journal de Chirurgie,* November, 1915) has had a large clinical experience with lumbar puncture to determine whether a wound of the skull was or was not penetrating. The fluid obtained was examined as to its color, its tension, its albumose, and its cytological content. A clinical trial showed that after such wounds the liquid would be clear, blood-red, bright rose color, or yellow. In simple wounds of the scalp verified by exploratory incision the liquid was clear in 42, in 4 rose-colored, and in 4 lemon-yellow. The colorless liquid is withdrawn two or three days after the injury. After twenty-four hours blood effused into the cerebrospinal fluid is hemolyzed, producing a yellow color which also promptly disappears. It is well known that after two to four days the liquid can become clear again, but that it remains yellowish for a long period. It is certainly surprising to find a rose-colored liquid in twenty-four hours. It follows that in 16 per cent of cases rose-colored fluid may be obtained when there is no penetration of the missile.

In 62 cases of wound of the scalp with bone lesion, without tear of the dura, the liquid was absolutely clear in 31; 4 times carmine red; 18 times rose; 9 times clear yellow. Clear liquid was found nearly always forty-eight hours after the wound, sometimes four or five days after. Rose-colored liquid was found usually, but not always, within two days. The red liquid was found always in about two days. The yellow liquid was found in a number of cases in two days, in a few much later.

In 14 cases trephining showed a large area of cerebral contusion. Clots were seen beneath the dura. Of these 14 cases, in three the liquid was clear, from which it can be concluded that when there is a contusion or fracture of the cranium the cerebrospinal fluid, though usually colored, may be clear. Even with an extensive contusion of the brain the fluid may be perfectly clear. Hence puncture is in itself of no value in determining for or against trephining. Of

six cases of small wounds of the open dura mater the liquid was clear once.

Finally, the author concludes that in simple wounds of the scalp the fluid is habitually clear, but may be colored (16 per cent); that in wounds with fracture or cerebral contusion the liquid is usually colored, but may be clear. Hence chromo-diagnosis is subject to considerable error.

As to tension, the normal fluid flows at the rate of about 60 drops to the minute. This is a rough clinical gauge, but should be supplemented by a manometer, which would give 10 to 15 cm. of water in the recumbent position; 8 to 10 more in the seated. The pressure is very little influenced by respiratory movements. Normal compression of the belly may raise the pressure as much as 8 cms. The manometer shows that high tension may be accompanied by escape of the fluid in drops, and that it may run out more rapidly under low tension. As the result of observation of 150 cases of hypertension the author concludes that hypertension develops very rapidly after traumatism; that it is inconstant in the bullet wounds; habitual in shell or grenade wounds. It is observed almost constantly in all those who are within the explosion zone of shells of large caliber. In big, open wounds the pressure is normal and low; in perforating wounds the same condition obtains. The author concludes that hypertension is not diagnostic in wounds of the head.

There exists a constant relation between the quantity of albumen and the quantity of cellular element found in the fluid, both depending upon the presence of inflammatory processes. As to cytological examination, a meningeal irritation produces first a lymphocytosis of no particular prognostic value. Polynuclear lymphocytes are distinctly grave indices. The author finally announces that lumbar puncture has no particular value either from the diagnostic or prognostic standpoint, but is priceless as a therapeutic agent in wounds of the head. He habitually punctures after trephining and believes that the lessening of pressure is favorable to healing. In extensive wounds he punctures every three days. The excruciating headaches are cured at once. One case was punctured twelve times in a month. Puncture has been particularly serviceable when there were large contused cerebral areas. The liquid remains yellow color for a long time. There is severe headache, which is relieved only by puncture. In cases of cerebral hernia puncture is sometimes followed by the signs of increased sepsis, for the most part transitory.

DIAGNOSIS OF DUODENAL ULCER.

According to AUSTIN (*New York Medical Journal*, Nov. 18, 1916) it appears that a diagnosis of duodenal ulcer must be based largely upon the four factors of periodical and characteristic fasting discomfort, if not pain; on the presence of hypersecretion, particularly of the alimentary variety rather than the continuous; on the presence of occult blood in the stool; and on distortions of the first part of the duodenum, as shown by the radiogram. A short perusal of any series of case histories will soon show that all of these are practically never found in any one case. When, however, any two or three are evident, we may well forego the presence of the fourth factor. The relative value of the history, of the character of the pain and its intermissions, and the detection at some time of occult blood in the stool, appears to the author to be of the greatest importance. On account of the close similarity of symptoms of duodenal ulcer and functional hypersecretion, the former lose much of their significance, and dependence must be placed more upon physical signs than upon symptoms, and, as hypersecretion is present both as a functional disorder and as the outcome of ulcer, we are driven to the conclusion that occult blood in the stool and the distortion of the duodenum shown by the *x*-ray examination are the positive signs upon which we must largely base our diagnosis.

As far as the differential diagnosis is concerned, there is probably no condition which so closely simulates duodenal ulcer as cholelithiasis. Reference is not made to the

typical attacks of gall-stone colic with vomiting, but to the advanced forms, where adhesions have taken place between the gall-bladder and the duodenum. It is common, too, to find in cases of gall-bladder involvement, by reflex action, the same hypersecretion which we may find with the ulcer, and, secondly, there is often the tender point so characteristic of the latter. The periodicity of attacks of cholecystitis is well known. In his experience, one of the most distinctive points of difference between these two conditions is the slight trace of bile found in the urine when the common duct and gall-bladder are involved. Still, with the greatest effort at learning the truth, mistakes are often made. Primary cholecystitis has produced such marked symptoms of duodenal ulcer by adhesions to the duodenum that the operation was undertaken with that mistaken diagnosis, only to find that the primary condition was an inflamed gall-bladder with several small stones. On the other hand, a man presenting himself with jaundice following an attack of typical pain, though a diagnosis of cholecystitis was made, was shown at operation to have a duodenal ulcer which, by causing adhesions to the gall-bladder, had produced obstruction in the common duct. In typical gall-stone colic, however, the pain reaches a severity which is never found with duodenal ulcer. Another characteristic feature is that the distress produced by duodenal ulcer can generally be allayed by food or an alkali, or, as one patient put it, "the employment of a hot drink," but these means are never successful in checking a gall-stone colic. Again, a marked distinction can be made by the common experience that icterus, or at least bile in the urine, occurs with cholecystitis, while blood in the feces is found more particularly with duodenal ulcer, although there have occurred in his practice cases of cholecystitis associated with arteriosclerosis, in which occult blood was found repeatedly in the stool, owing probably to the rupture of some small arteriole in the intestinal tract.

The distinction between gastric ulcer situated near the pylorus and duodenal ulcer is often impossible; in the writer's estimation, it is a mere refinement of diagnosis to reach such a decision, so that, like many practitioners, he merely refers to the lesion as a gastroduodenal ulcer, leaving it to the surgeon to differentiate. The ulcer inside the pylorus, or, in other words, on the gastric side, has been found by the author to be much more likely to produce gastric stasis, either through the redundancy of the scar tissue or by means of the pyloric spasm which so often accompanies it. As to the delayed pain or fasting discomfort, there is little or no difference whether the ulcer is inside or outside the pylorus. This does not exclude the possibility of saying that the ulcer is of gastric origin when it is situated in the lesser curvature or in the fundus, where, unquestionably, pain occurs much earlier.

Another difficulty which has apparently confused many diagnosticians is the differentiation of duodenal ulcer and appendicitis. In more than half of the operative cases which have come under his observation, the appendix had been removed without more than temporary relief of pain and discomfort. In many of the reports which have been received in regard to the condition of the removed appendix, it is plainly indicated that there was not a distinctly diseased organ; such terms as "moderately enlarged" and "slightly congested" being employed to designate its condition. Whether this similarity is due to the reflex relation of the plexuses, by which pressure applied above the navel causes pain at the appendix or not, or whether there is an associated causal relation between mild disease of the appendix and a duodenal ulcer, as has been held, is not certain. At least, whenever the appendix has escaped removal and patients are operated on for duodenal ulcer, the appendix, at the author's suggestion, has always been removed.

Moynihan calls attention to this associated lesion of the appendix and the duodenum, considering it probable that the duodenal ulcer is secondary to the invasion of the appendix and due to a toxemia arising from the latter. On the other hand, Schrijver

declares that, when both pathological conditions are found, the appendicitis is more likely to be secondary or oftener a coincident affection. The conjoint condition of duodenal ulcer and inflamed appendix has not been found by him with the frequency that it has been by Moynihan. His own opinion has always been that the diagnosis of diseased appendix is often made in error on account of the reflex relations of the plexuses involved, and that unless undoubted evidence of disease in the right lower quadrant is present, in the form of tenderness at McBurney's point, rigidity of the right rectus over it, and attacks of slight rise of temperature, it is much wiser to let the surgeon make the median incision and examine the region of the duodenum, at the same time removing the appendix, if the duodenum is found normal. At least, confusion occurs only with the so-called chronic condition or appendicitis larvata.

THE MECHANICS OF THE STOMACH AFTER GASTROENTEROSTOMY.

A careful paper on this subject by JACOBSON and MURPHY (*American Journal of Obstetrics,* January, 1917) concludes as follows:

That all patients examined in this series were uniformly well.

That gastroenterostomy openings properly made and placed do not obliterate.

That the gastroenterostomy openings functionate equally as well in the presence of either an open or closed pylorus.

That it is not necessary to artificially occlude the pylorus in gastroenterostomy.

That the gastroenterostomy opening to secure the maximum amount of drainage must be of ample size and placed as near the pylorus as possible, preferably in the antrum pylori. Such openings must not be made on the fundus of the stomach nor on the lesser curvature.

That gastroenterostomy is essentially a drainage operation.

That serious distention in the jejunum does not occur after gastroenterostomy; the food is seen to pass rapidly through the many loops of the small intestine before it finally stops. Even in those patients who are entirely relieved of their former symptoms food can be forced backward into the stomach from the jejunum, and although this can be done easily, such regurgitations do not seem to make any difference.

NEW MERCURIAL PREPARATION IN THE TREATMENT OF SYPHILIS.

LAUTMAN (*Medical Record,* Jan. 13, 1917) states that an emulsion of 10-per-cent mercury benzoate and 2-per-cent quinine and urea hydrochloride in white petrolatum makes an excellent preparation for intramuscular injection in syphilis.

It is no more painful than any of the other preparations in use, and permits of giving three grains of the salt each week.

In twenty-five unselected and previously untreated cases the blood Wassermann was changed from a four plus to a negative in an average of eight weeks. The influence on the existing lesions was very favorable.

This communication is not intended to convey the impression that a negative Wassermann means that the syphilitic process has been cured or arrested, but the favorable effect on the Wassermann reaction would seem to indicate the process has been temporarily controlled.

Mercuric benzoate is the mercuric salt of benzoic acid, having the formula $Hg(C_6H_5COO)_2$ plus H_3O. It belongs to what is known as the half-complex organic compounds, in which the element mercury is no longer free as an ion, but is in combination with an organic substance. As such it attacks proteins less vigorously, and is, therefore, considered less toxic. It contains about 45 per cent of mercury, and is usually employed in a ½-per-cent solution in normal saline, as recommended by Gottheil. Solutions of 1, 2, or even 5 per cent may be employed, but regardless of the strength of the solution, if the dose is increased beyond a sixth of a grain, painful inflammatory reactions are apt to ensue.

The preparation employed by Lautman is made by first grinding up quinine urea

hydrochloride in one hundred parts of white liquid petrolatum in a mortar and adding with careful trituration small quantities of the benzoate and oil. A perfect emulsion is obtained, which can be easily aspirated through a twenty-gauge needle.

The injections should be intramuscular after making certain the needle is not in the vein. The well-shaken-up emulsion is injected from an all-glass 2-Cc. syringe and the needle withdrawn. The site of injection is then massaged well for a few minutes to insure the distribution of the injected material. For cleaning and sterilizing the syringe, a little alcohol is sufficient.

Lautman usually gives one grain of the benzoate at a dose, and repeats this three times a week. What little pain there is usually is well tolerated; it generally starts about an hour after the injections, and lasts for five or six hours, leaving only on the following day a feeling of lameness on the injected side. Painful indurations rarely develop, and when present are due to the fact that the needle was not in the muscle.

THE MORBID ANATOMY OF WOUNDS OF THE THORAX.

Henry and Elliott (*Journal of the Royal Army Medical Corps,* November, 1916) summarize an excellent clinical study of this subject as follows:

The paper analyzes the cause of death and findings in 100 consecutive cases of fatal wounds of the thorax seen at base hospitals of the line of communication in France.

Of these deaths ninety-six were directly caused by septic poisoning. Only four died from hemorrhage, and three of these were cases of secondary hemorrhage induced by sepsis.

Bruising and laceration of the lung was found around the wound tract in nearly all the cases. The source of the hemothorax seemed as a rule to have been from vessels in the lung.

The laceration was not a serious lesion when accompanied by a hemothorax; but in the absence of the latter it was liable to form the starting-point of a septic bronchopneumonia which, being unchecked, since there was no collapse of the lung, spread quickly, and proved fatal.

Ordinary lobar pneumonia was never observed on the side of the injured lung, and it was found in the contralateral lung in only three cases out of seventy-eight that had hemothorax.

PROSTATECTOMY.

Borchgrevink (*Tr. XI North. Surg. Cong., Goeteborg,* 1916, July; quoted from *Surgery, Gynecology and Obstetrics,* January, 1917) contributes a paper that is not without interest to American surgeons. It is stated that the advances made during the last few years in the operation of prostatectomy consist in the two-stage operation (preliminary suprapubic cystostomy or residual catheter), careful attention to hemorrhage (tamponade or suture), good drainage (either by means of a wide suprapubic opening or by means of Pezzer's catheter), and especially in the employment of local anesthesia (either epidural, sacral, parasacral, or better still the direct anesthetization of the prostate and surrounding structures). Recently the author has also performed vasectomy for the prevention of epididymitis.

Of 114 cases, 16 were operated upon perineally; 7 died. The high mortality rate is due to the fact that the indications for the operation were carried too far. As has previously been mentioned by Israel, the perineal operation permits poorer drainage than the suprapubic. Seventy patients were operated upon suprapubically with a mortality of 7.3 per cent. In 20 cases a suprapubic fistula was made.

In three cases the operation was complicated by a bladder abscess, and in two others the seminal vesicles were removed with the prostate. No serious hemorrhage was present in any case, and if the operation is performed under local anesthesia it is almost bloodless. In the last 24 cases no tamponade of the bed of the prostate was done. Hemorrhage did not occur.

Complications during convalescence outside of the common ones (as pneumonia, bronchitis, embolism) were epididymitis, infection of the abdominal wound, urinary retention with fever, urethritis after introduction of a catheter, and stricture of the urethra. In one case the edges of the bladder wound closed up over the bed of the prostate, necessitating excision.

Indications for the operation are: catheter life, transient total retention, ischuria paradoxica, and prolonged and increasing urinary disturbances. In those cases in which the general condition is poor, in bronchitis, and in advanced arteriosclerosis, operation can be performed occasionally, but only without narcosis and after thorough preliminary drainage of the bladder and feeding of large quantities of fluids, and after the administration of urinary antiseptics. In severe urinary infection, or where there are symptoms of urinary insufficiency (polyuria, specific gravity below 1010, low nitrogen excretion), and in gastrointestinal uremia, operation may be performed occasionally. Cancer was found in 9.7 per cent (14) of cases. In seven cases the diagnosis was certain on account of the decreased mobility of the prostate. The operation in cancer should be performed only where there is a possibility of removing it entirely, otherwise symptomatic treatment should be given.

Tengwell reported 109 transvesical prostatectomies performed for urinary retention. In the first 50 cases lumbar anesthesia was employed—3-per-cent tropacocaine solution. This was discontinued, however, on account of severe poisoning cases and one death due to it, and was followed by local anesthesia in combination with light ether narcosis. The author filled the bladder with air principally, and used Kuemmell's after-treatment.

Among the 109 cases there were 12 deaths (11 per cent). In 80 cases a good result was obtained. The author operated if after a preliminary retention catheter treatment lasting two weeks there still was 200 Cc. of residual urine, or if the urinary attacks were severe; occasionally also after acute attacks of retention for social reasons. All patients, however, who had prolonged retention or showed signs of urinary poisoning or infection of the urinary tract were treated with the permanent catheter for a long time previous to operation, and if the symptoms did not cease the operation was not performed. After the operation a catheter is inserted in the urethra in addition to the wide suprapubic drain, and irrigations of the urethra around the catheter are employed freely to avoid epididymitis. To avoid stricture sounds are introduced once a month for six months after the operation. In one case the bladder wall had closed completely over the internal urethral orifice.

In nine cases a probable diagnosis of cancer was made clinically. In cancer of the prostate the radical operation by the perineal route should be performed; the author, however, resorted to palliative treatment only.

Ekehorn stated that he had a mortality rate of 11 per cent, the patients themselves demanding the operation. The time of cure is about thirty days. The result is good; 16 patients do not have to void urine at all during the night, 12 patients only once, 7 patients twice, and 6 more than twice. Infection of the urinary passages is no contraindication. Cancer of the prostate is common; as it is difficult to diagnose, early operation is necessary. Recovery in cancer is just as rapid and the functional result is just as good temporarily as in the other cases.

Euren performs partial removal occasionally in parenchymatous hypertrophy. He always employs the transverse incision through the skin and fascia (occasionally also a small incision through the muscle), transverse incision through the bladder, and drains from one corner of the incision. In infected cases irrigation of the urethra and bladder is employed before operation.

Von Holst analyzed the material of Professor Dahlgren from the Sahlgre Hospital, including 142 cases of prostatic hypertrophy. Of these 42, or 20.6 per cent, were operated upon under local anesthesia, the

others with lumbar anesthesia. Twenty-eight were operated transvesically, 3 transperineally, 10 with cystostomy, 1 with vasectomy. The mortality rate with transvesical prostatectomy was 11.9 per cent. Of the non-operated cases 8 per cent died. The duration of convalescence was twenty-nine days. The functional results were good—8 patients do not urinate at all during the night, 3 once, 4 twice, and 2 three times.

Bull performed 40 prostatectomies (two perineal) with a mortality rate of 10 per cent, and 12 cystostomies with a mortality of 50 per cent. He operates under local and sacral anesthesia. Complications after operation are frequent (75 per cent). Cancer was found clinically or by the microscope in 15 per cent of cases. If the diagnosis of cancer is certain, only a cystostomy is performed. The hard consistency of the prostate is the most frequent symptom.

Bauer examined 22 out of 27 extirpated prostates and found cancer in five cases (22 per cent). Although the material is small it nevertheless shows about the same percentage of cancer as do larger series. One must therefore figure on a fair percentage of cancer cases in all prostatectomy operations even though the clinical symptoms point to a simple hypertrophy.

Rovsing stated his belief that it is certain that the hypertrophy arises from the paraurethral glands as the prostate surrounds the hypertrophy, and the patients therefore do not become impotent after the operation. He does a total removal more frequently than formerly, but has had only 60 cases so far with 10 fatalities. In 11 operated cases the result was bad (retention, bladder-stone, stricture of urethra). He has performed 130 cystostomies, however, and he always advocates that this should precede the removal of the prostate, it being especially indicated in pyelitis to decrease the virulence of the infection. If the patient desires it later a removal operation may then be performed, as the operative mortality is from 10 to 20 per cent, and recovery can never be guaranteed. The aseptic cases with kidney insufficiency frequently deceive one and are best treated with cystostomy. He protested emphatically against the filling of the bladder with air, on account of the danger of embolism.

Schilling has performed 30 prostatectomies. After the operation three cases of cancer were found among them. He is very well satisfied with parasacral anesthesia and finds local anesthesia of the prostate too complicated. The results are good. In cases of hemorrhage he tampons for fifteen minutes. The bladder wound is closed completely around a large drain which empties into a bottle, and the drain is removed after six days. In three cases he closed the bladder primarily without drainage.

Wessel operated upon 20 cases without a death, but chose for operation only cases which were not infected. Cases of the soft succulent form which bleeds easily were helped considerably by a vasectomy, as mentioned by Rovsing. The prostatic part of the urethra is not only lengthened by the hypertrophy, but it is also dilated (Lengdorf) so that a pocket forms which is open toward the bladder and easily leads to a cystitis.

Borelius demonstrated a large prostate—455 gm.—removed through a transverse incision under sacral anesthesia in combination with local anesthesia.

Key does not consider the operation for clinically diagnosed cases of cancer as absolutely hopeless if all the fascia and connective tissue of the pelvis are removed. Of three operated cases, one has lived one and one-half years without recurrence, and two for one year with recurrences.

Floderus reported 50 transvesical prostatectomies with a mortality of four, or 8 per cent. In three cases the operation was very prolonged on account of adhesions.

Forsell employed local anesthesia of the prostate in 57 cases, with seven deaths. Before enucleation of the prostate the author made a circular incision of the bladder mucosa, and with this procedure never had a stricture result. He never employed a residual catheter after the operation.

Tandberg extended the indications for the operation and therefore also has a high mortality. Among 14 cases there were five cases of cancer. In one case the prostate weighed 500 gm. Local anesthesia had been disappointing, and he therefore employed ether in preference. All operated patients except one preserved their sexual functions.

Backer-Groendahl mentioned the methods of determining the function of the kidneys before operation. By means of curves he showed the diuresis, nitrogen excretion, specific gravity, albumin, and phenolsulphonephthalein excretion. A definite decrease in the excretion of these substances occurred, especially of the last, after a cystostomy, as the cessation of the retention influences the kidney. A later prostatectomy produced no shock.

Kuren criticized the employment of cystostomy. He considers it an unbearable procedure requiring careful nursing and later causing infection of the urinary passages and stones.

Sandberg stated that while most operators control hemorrhage with tampons, he accomplishes this with adrenalin solution through a Nélaton catheter; later daily irrigations to remove coagula.

Tengwall answered Rovsing's argument by saying that the unpleasant flooding of the operative field by fluid can be safely avoided by the employment of air. If the operation were performed only on the non-infected, only a very few cases would be operated.

Rovsing contended for cystostomy and explained the after-treatment. The catheter must be changed about every six weeks; in changing it one risks infection, therefore it is necessary to follow the introduction of it with an injection of lapis, otherwise no irrigations should be employed. With the first signs of infection another injection of lapis should be given. Those patients who find a cystostomy objectionable can always have an ectomy performed later.

Borchgrevink closed the discussion by again recommending the two-stage operation. The infection may first be taken care of by a cystostomy, not in the sense of making the urine sterile, but to dissipate the general intoxication. Nevertheless, after a successful cystostomy operation the ectomy may be followed by a transitory uremia. The infection of the abdominal wound can be avoided if it is left wide open or drained well. In regard to hemorrhage he recalled Israel's words that if one did not desire any one need not have any. The question of operating for cancer is a problem; some time may be gained for the patient.

CASES OF TETANUS TREATED IN HOME MILITARY HOSPITALS.

Sir David Bruce (*Lancet*, Dec. 2, 1916) concludes his study of this subject as follows:

In the 195 cases of tetanus under review the mortality was 49.2 per cent.

Cases with a short incubation were more fatal than those with a longer incubation.

The greatest number of cases occurred on the eleventh day after the wound.

There are no allusions to the use of antitetanic serum as a prophylactic in home military hospitals.

In regard to the therapeutic effect of antitetanic serum the evidence as collected from the 1915-6 reports is not conclusive.

In the cases under consideration the advantage of the intrathecal route over the subcutaneous or other routes is also not conclusive.

There is no evidence that any benefit accrued to the cases treated by carbolic acid or magnesium sulphate injections.

With our present knowledge the treatment of a case of tetanus might be as follows:

Place in a quiet, darkened room under the care of a sympathetic and capable nurse. "Rest, sleep, and food" are looked upon as the first essentials of treatment.

If thorough surgical treatment is carried out on wounds from the beginning, so as not to allow the presence of necrotic tissues or foreign bodies, the number of cases of tetanus should sensibly diminish, if not al-

together disappear. But if a case does occur, then the wound should not be actively interfered with until the tetanic symptoms have subsided.

The intrathecal injection of large doses of antitoxin, of high potency if available, should be begun at once, and supplemented by intramuscular and subcutaneous injections.

In addition, if necessary, the patient should receive sedatives, of which morphine in ¼-grain doses and administered every four hours is perhaps the most suitable. Chloral, chloretone, and other sedatives are also given by the mouth or rectum.

TUMORS OF THE SPINAL CORD.

BECKMAN (*Journal-Lancet,* Jan. 15, 1917) reports 18 cases of tumor of the spinal cord. Two were extradural; seven were intradural but extramedullary; six were intramedullary. There were two angiomas and two cysts. The duration of symptoms varied from one to fourteen years, the latter in the case of a cyst of the dorsal region. There were seven cases of glioma, three of sarcoma, three of angiomas, one of psammoma, one of fibroma, and one of tuberculoma. There were three deaths, three cures, four improved, and five unimproved. In two there was questionable improvement.

Beckman concludes that many tumors of the spinal cord are overlooked because the average physician is not familiar with the methods of neurologic diagnosis. In order to obtain better results with fewer cases of permanent paralysis, it is necessary that these tumors be diagnosed early and operated on during the early stages. Obviously, pressure maintained on the spinal cord for a considerable length of time produces a degenerative process in the delicate cord structures from which there is no regeneration. He believes that in many instances in which the diagnosis of cord tumor is not absolute, but in which there are level symptoms, a laminectomy should be advised. Root pains are a common symptom in most cord tumors. In some instances the pain may be so slight, or the predominance of other symptoms at a later period may so overshadow the previous pain, that it is entirely forgotten by the patient, and can be obtained only by the most careful questioning. Level symptoms are always present in the later stages, although tactile, pain, and temperature sense may not be involved to the same degree. In some instances, one of these may be absent, and the tumor may then be located by the definite level of the others.

Beckman urges a more careful examination in neurologic conditions and a more frequent and earlier laminectomy in cases of suspected tumors as the only method of preventing crippling due to long standing pressure of tumors on the cord.

A STUDY OF THE CEREBROSPINAL FLUID IN FIFTY CASES OF CEREBROSPINAL SYPHILIS.

SUTTER (*New York State Journal of Medicine,* January, 1917) believes that every case of syphilis should have a lumbar puncture made and fluid examined. This examination should include the estimation of the pressure, the globulin determination, the cell count, Lange's colloidal gold chloride reaction, and the Wassermann reaction. The cell count should be made as soon as the fluid is removed to prevent error from hemolysis.

The study of the cerebrospinal fluid is of greater importance in nervous cases than that of the blood serum, for it shows not only that the patient has syphilis, but also indicates that the nervous system is implicated. A positive reaction in the cerebrospinal fluid is present only when the nervous system is involved. In syphilis the Wassermann reaction will usually be positive, the globulin in excess, the gold chloride reaction present, and the cell count increased above six per c.m.m., the number depending on the meningeal irritation. If the syphilis is confined to the brain alone, the Wassermann reaction in cerebrospinal fluid may either be negative or fleeting,

whereas the blood serum is generally positive. The reason for this is the stasis in the lower part of the cord and the small amount of active communication between the fluid of the brain and spinal fluid.

The cytology is a very important element in the study of the cerebrospinal fluid. When studied differentially it gives some insight into the severity of the meningeal reaction. The Wassermann and other reactions are of value in determining the etiology of the affection, but the intensity of the meningeal affection is usually more clearly shown by the cytology. Variation in the cell count is sometimes found at intervals in any stage of the disease. Sometimes high or low counts persist for considerable lengths of time in various stages of the disease. A large number of counts were made by Dr. Paul Weston, of the Warren State Hospital, Pa. He found that they varied from day to day and without apparent reason. In all instances the counts were made within a few minutes of taking the spinal fluid, so that no opportunity for cytolysis was given.

The dividing line between normal and pathological spinal fluid appears, according to statistics, to be about five or six cells per c.m.m. In tabes dorsalis the count is never higher than about 100, usually from 40 to 60. This number diminishes in the declining stages of the disease.

The globulin reaction gives us a means, in doubtful cases, of differentiating between functional and organic affections of the central nervous system, but not between luetic and non-luetic conditions. Excess of globulin always means organic disease, while its absence, like most negative findings, is not of equal value in absolutely excluding organic conditions. Real significance in the findings in differential diagnosis becomes apparent only when the presence or absence of the reaction is carefully construed with a full knowledge of all the clinical facts in the case. The Noguchi butyric acid test seems the most reliable and delicate. It is always present when the other globulin reactions are positive.

The Lange colloidal gold chloride reaction is a useful adjuvant to the Wassermann and other tests in the cerebrospinal fluid. It is present in most cases of syphilitic involvement of the central nervous system. In general paresis there is a distinct curve, which is known as the "paresis curve." In tabes dorsalis the reaction is not quite so characteristic and is present less frequently. The reaction is more delicate than the Wassermann, the cell count, or the globulin content. It is nearly constant in syphilis of the central nervous system; it is extremely sensitive and is reliable when positive; the amount of fluid used is quite small (0.2 Cc.); definite conclusions are reached with ease and rapidity; the margin of errors is exceedingly small; it runs parallel with the Nonne Phase I and Noguchi and bears relationship to the Wassermann reaction, which is constant. The chief advantages in this reaction are the small amount of fluid, its technical simplicity, the sharpness of the reaction, and its delicacy. The reaction is particularly useful in differentiating incipient general paresis and neurasthenic disturbances in a syphilitic.

The Wassermann reaction, when unmistakably positive in the cerebrospinal fluid, is highly characteristic of the syphilitic process, and, generally speaking, is of greater significance than the blood Wassermann when it is desired to establish the nature of a given nervous disorder. The positive reaction, because of the possibility of many technical errors, is of more value than a negative reaction. The chief source of error is in the employment of various techniques and reagents by the different serologists.

The positive Wassermann reaction is now a more constant finding in the cerebrospinal fluid since a larger (five times) quantity of fluid is used in performing the test. Sometimes the reaction, negative with the smaller amounts, is positive with the larger amount. Hence a negative response should not be accepted as decisive until the technique with the larger amount has been

used. The use of such large amounts of spinal fluid does not tend to produce positive findings in non-luetic cases.

Signs and symptoms in cerebrospinal syphilis are quite manifold and varied. This is due to the variation in site of involvement and to the character which the process exhibits. In the cerebrospinal fluid we find a more constant picture. Almost every case shows a strong globulin reaction, a positive gold chloride reaction, and a positive Wassermann reaction.

Eleven cases of clinically diagnosed tabes dorsalis appear in the author's series. Most of these examinations were made after the patients had been given considerable treatment. This alters the findings somewhat. The globulin reaction was present in seven cases, weakly positive in two, and negative in two out of the eleven cases. The cell count increased in eight, normal in one, and border-line in two cases. The highest count was 55. The Lange gold chloride reaction in this series of eleven cases did not show any characteristic curve. Five cases showed some color changes, but no marked color changes in the tubes were seen except in cases 14 and 20. Both of these cases also showed a large increase in globulin and in the cell count.

The Wassermann reaction was positive in the serum in five cases and in the fluid in seven out of eleven cases. In one case it was negative in the serum and positive in the fluid. In all the other cases the findings were consistent. One case had decided ataxia, but no other clinical signs. It was diagnosed as irregular tabes.

The strongest and most characteristic reactions were seen in a series of 20 cases of paresis. All cases showed well-marked color changes in the Lange colloidal gold chloride reaction. The typical "paresis curve" was seen in all the tests. The highest cell count was 50. It was normal in two cases, and there was only a slight increase in another. The globulin was positive in 16 cases, weak in two cases, and negative in two cases. The Wassermann reaction was positive in all but two cases. One case showed negative reaction in the serum and positive in the fluid.

Nine cases of tabo-paresis were studied. In all cases all the tests were positive. The cell count varied from 10 to 70. The globulin was strongly positive in all but one case. The Wassermann reaction in this case was positive in one laboratory and negative in another in both serum and fluid. In one case the clinical diagnosis was irregular tabes. In all other cases observed the clinical signs were well marked.

The clinical picture of paresis, especially in those cases which come under observation in private practice, is most commonly of the tabetic type, and is better known as tabo-paresis.

In the light of our present knowledge lumbar puncture with cerebrospinal fluid examinations is demanded in all cases of syphilis. With proper technique and careful interpretation of the findings, the examination of the cerebrospinal fluid, although not always conclusive, is of unequaled and incalculable diagnostic value.

OBSERVATION ON BLOOD-PRESSURE DURING OPERATION.

Moots (*American Journal of Obstetrics*, December, 1916) observes that in some of the most renowned teaching centers blood-pressure readings are taken only of systolic pressure, and this by individuals whose lack of professional training prohibits all possibility of any intelligent idea of myocardial, endocardial, or vascular changes, or the relation of these changes to pressures. Diastolic pressure he defines as that existing in the artery under observation during the diastolic pause just preceding the succeeding cardiac systole. Taken alone it is the truest index of arterial tension. No matter what the systolic may be, if the diastolic is high there is a true hypertension of the vessels, but if the diastolic is low we are dealing with a hypotension, and this is true irrespective of the systolic pressure. Pulse pressure is the force necessary to move the column of blood in the artery.

It represents the force exerted by the contracting ventricles in excess of the diastolic pressure.

Systolic pressure is the sum total of pressures existing in the artery; it represents the diastolic pressure plus the pulse pressure, shows the energy being expended by the myocardium at a given moment, and is therefore very variable. It may be stirred by psychic influences, by physical stress. Taken alone it is not nearly so important as diastolic pressure. Combined with other pressures it is invaluable, as it clearly shows the endeavor that the heart is making to maintain circulatory equilibrium. By pressure ratio is meant the percentage obtained by dividing the pulse pressure by the diastolic pressure. For example, a case has a systolic pressure of 120 and a diastolic of 180; the pulse pressure is 40 and the ratio of pulse pressure to the diastolic is 40 to 80 or one-half, which means 50 per cent of the diastolic pressure. This pressure ratio is really an important matter, as it represents "the relationship existing between the kinetic energy expended by the cardiac contraction in moving the blood column and the potential energy stored in the arterial walls and column of blood which they contain."

The ratio may be normal between 40 and 60 per cent. The pressure ratio is either low or high, and there is reason to apprehend danger. The auscultatory method is the one upon which dependence should be placed. This will forecast an approaching storm long before it can be determined by any other method. Unvariable pressures during operations are the result of most painstaking efforts on the part of the surgeon, anesthetist, and every one concerned in carrying out a shock-free technique. As a result of his observations Moot concludes that the systolic pressure alone is of very slight, if any, value. The diastolic pressure alone is of much more value than the systolic alone.

The pressure ratio is the essential factor, and offers the earliest danger-signal.

There are certain elements in technique which have a marked constant effect upon the pressures. These are as follows:

The psychical or emotional state of the patient; the position of the patient upon the table, the extreme Trendelenburg being the worst.

Overdosing by the anesthetist; the amount of traumatism inflicted by the actual operation, such as cutting and tearing the tissues with scissors, the hands, and other dull instruments; the packing of large gauze packs, instead of rubber tissue, into the abdominal cavity.

The preservation of the fluids in the body up to the hour of the operation, this being absolutely necessary to maintain the usual pressures.

RUPTURE OF THE CÆSARIAN SCAR.

RONGY (*American Journal of Obstetrics*, December, 1916) concludes his paper as follows:

Spontaneous rupture of the Cæsarian scar occurs in about 3 per cent of cases. In most instances rupture takes place during labor. It does take place not infrequently during the latter half of pregnancy, especially in the last six weeks.

We have no means by which we can judge the strength of the scar. Rupture will occur in cases which run an afebrile course and in which union of the wound is apparently by first intention.

One-third of all patients who undergo subsequent Cæsarian section show evidence of inflammatory reaction in and about the uterine wound. The result in such cases is a weakened scar.

Proper suturing of the uterine wound and exact approximation of the edges will not always prevent subsequent rupture of the scar.

The mortality rate of repeated section is smaller than that of primary Cæsarian section, because these patients are more carefully watched.

A patient who has once had a Cæsarian section should not be allowed to go through a tedious or severe labor. If labor does

not progress rapidly, Cæsarian section should be performed.

When advising a patient to have a Cæsarian section, the management of subsequent pregnancies should be taken into consideration and discussed with one of the members of the family.

As a general rule, it may be stated that fully 75 per cent of women who have had a Cæsarian section are delivered by repeated section during their subsequent labors.

The obstetrician should always bear in mind that Cæsarian section creates a new problem for the woman, and therefore he should carefully weigh the indications before he decides upon the abdominal route. He should remember that the dictum, "Once a Cæsarian, always a Cæsarian," holds true in fully 75 per cent of cases.

Finally, it is his firm belief that Cæsarian section is very frequently resorted to in cases which should be delivered by other methods. Abdominal section is a major obstetrical operation. Surgeons and gynecologists, who have no obstetrical knowledge, are not competent to make a proper diagnosis and should not perform it. Obstetrics, in order to gain the respect of both the community and the medical profession, should be practiced only by those who have had a proper training. The interest of the pregnant woman will then be properly safeguarded.

MISTAKES IN DIAGNOSIS OF ECTOPIC PREGNANCY.

Lytle (*New York Journal of Medicine*, January, 1917) states that in a series of ten cases admitted to the New York Hospital four of them were incorrectly diagnosticated by the hospital staff. It is estimated that in at least 50 per cent of them the physician fails to make a correct diagnosis. The written descriptions of the disease as a rule describe it as it appears after severe internal hemorrhage has taken place, which is quite a different picture from that which obtains in the pretragic stage, before collapse from hemorrhage has occurred.

These cases if treated early present a very low mortality.

Moreover, they are sufficiently frequent to make them an emergency likely to be found by every physician doing general practice. Among the cases presenting themselves at the out-patient department of Leland Stanford University, one in 131 cases of pregnancy was ectopic. In another large series of cases of pregnancy there was one case of ectopic pregnancy to sixty-two of uterine pregnancy, and Noble has estimated the condition present in 3 or 4 per cent of all the laparotomies done by him.

One of the most common mistakes in the diagnosis of ectopic pregnancy has been the diagnosis of uterine abortion, impending or incomplete. Of the 90 per cent who consulted a physician before rupture, in the series of 130 cases reported by Harris, a large proportion were told that an ordinary abortion was threatened, was occurring, or had occurred. Another kind of mistake is that of making the diagnosis of acute appendicitis first, when the patient complains of abdominal pain, with vomiting, but it should be emphasized that it is important to think also of ectopic pregnancy in all cases of abdominal colic in females in whom pregnancy is possible.

The writer asks: If then, we are not to require these severe symptoms to remind us of ectopic pregnancy, what are the symptoms that should make us suspect the condition?

Uterine hemorrhage is one of the most significant features.

We should be suspicious of flowing that is four or five days to a month overdue. This is usually scanty in amount and is spoken of as spotting. In many cases it is reddish-brown and does not clot, while in others it appears to be like a normal menstruation overdue. One must not be misled, however, by the fact that the catamenia are not overdue. In one series of cases only 50 per cent had missed a period. Nevertheless, any irregularity in bleeding should be a subject for close inquiry. The

character, amount, and duration of any flowing, whether before or after the date on which menstruation is expected, should be most closely observed. Besides the flowing, pain is a most important symptom. It is usually the only important subjective symptom before there has occurred any interruption in the condition of the fetus in the tube. It is present in over 90 per cent of the cases, and is usually located over the seat of the disease. Sometimes it is constant and sometimes colicky. It may be absent when the patient is quiet, but present when the patient moves about the room. In the unruptured cases it is likely to be mild, as it is also in the cases of tubal abortion, while in the cases of rupture it is often a very severe pain, cutting in character. The discovery of a tender mass on the same side of uterus as the pain adds to the certainty of diagnosis. Faintness is sometimes experienced, even before rupture, and fever is the rule after blood has leaked into the abdominal cavity. Many are the combinations of conditions and symptoms in different patients. The diversity is so wide that mistakes are bound to occur. "No pelvic condition gives rise to more diagnostic errors," to quote DeLee.

Mistaken diagnosis will be less frequent, however, when our mental picture of ectopic pregnancy is not the classical ruptured ectopic, but when we visualize these cases as they are before rupture, when the symptoms are mild and seem less urgent.

ESOPHAGECTASIA.

SHAW and Woo in a paper under this title give their opinions as follows (*Lancet*, Dec. 2, 1916):

Such cases in the past have been frequently referred to as examples of cardiospasm, by which is meant that quite independent of any organic lesion spasm occurs in the circular muscular fibers round the cardiac orifice of the stomach (cardiospasm). The obstruction caused by this phenomenon leads to a dilatation of the esophagus and to a variable amount of hypertrophy of the muscle of the tube, food being retained in the esophagus, irritating its walls, leading to chronic inflammation, and assisting in bringing about dilatation. This might be looked upon as a sort of positive cardiospasm, but unfortunately there is no proof histologically that there is hypertrophy of the muscles of the cardia such as might be expected if spasm had occurred.

The outstanding features which should attract the physician's attention to these cases are as follows: When food does not seem to pass down the esophagus properly it "sticks" behind the breast-bone, and may even cause pain in the epigastrium; further, this "sticking" of food has been noticed frequently for a few or many years. Relief is got by making the food come back, the patient securing this by tickling the fauces, attempting the act of vomiting, or by coughing, or by taking a deep breath. It will be found that the taking of a meal is followed by a feeling of difficulty of breathing, actually described by some patients as a feeling of stifling or of asthma, which is only relieved by again bringing up the food. In some cases a condition of persistent cough is provoked by taking a meal, as if the dilatation of the esophagus irritated the lung and caused a reflex cough, the combination of cough with attacks of respiratory embarrassment provoking in these cases the opinion that the patient is suffering from true bronchial asthma. When studying the transit of a bismuth meal by means of *x*-rays in cases of so-called "dyspepsia" it is very necessary to observe the shadow in the esophagus as well as in the stomach and intestine; two at least of the above cases were missed from want of this precaution. These patients soon learn that the best way to obviate symptoms is to masticate very thoroughly and to spend some extra time over their meals, avoiding all "bolting." If this plan fails they generally betake themselves to liquid diet, which they can deal with comfortably.

REVIEWS.

THE GROWTH OF MEDICINE. From the Earliest Times to about 1800. By Albert H. Buck, B.A., M.D. Yale University Press, New Haven, 1917. Price $5.00.

Dr. Buck will be remembered by older practitioners as the editor of the earlier editions of "The Reference Handbook of the Medical Sciences," and by former students of the College of Physicians and Surgeons of New York as Clinical Professor of Diseases of the Ear in that institution.

The present volume is the first work published by the Yale University Press under the Williams Memorial Publication Fund, a fund founded by a medical graduate of Yale University whose father and grandfather before him had been graduates of the same school. As is well pointed out, there are not many physicians who possess even a slight knowledge concerning the manner in which the science of medicine has attained its present power as an agency for good, or concerning the men who played the chief parts in bringing about this great result. This is in part due to two causes: First, the student's need of keeping up with modern medical progress prevents the medical man from studying medical history; and second, much medical history is presented in such a dry and uninteresting form that it requires an effort to study it, when if it was properly placed before the reader it would give him hours of recreation. It is to fill the last need and to provide the profession with a reliable and interesting story that Dr. Buck has prepared this volume, which, in large type and well leaded, covers nearly six hundred pages and deals with medical history up to 1781. At the close of the volume there is a list of the more important authorities consulted, and throughout its pages there are foot-notes which give additional references.

The text is divided into three parts. The first contains sixteen chapters and is devoted to Ancient Medicine, the sixteenth and closing chapter being entitled "The Influence of Christianity upon the Evolution of Medicine." The second part deals with Mediæval Medicine, starting out with "The Condition of Medicine at Byzantium During the Early Part of the Middle Ages," and closing with a chapter devoted to "Pharmacy, Chemistry and Balneotherapeutics." The third part deals with "Medicine During the Renaissance," beginning with a discussion of "Important Events that Preceded the Renaissance," discussing "The Founders of Human Anatomy and Physiology," and closing with a chapter upon "The First Appearance of Syphilis in Europe as an Epidemic Disease," with the subjects of "Medical Journalism" and "The Beginnings of a Modern Pharmacopœia." There are also twenty-eight illustrations in the volume, either of individuals or of buildings closely associated with advances in medicine.

The book is evidently the result of a pet study on the part of its learned author, who well along in the eighth decade of his life has had the energy and vigor to present in accurate and readable form the facts which his professional brethren ought to know.

INTERNATIONAL CLINICS. A Quarterly of Illustrated Clinical Lectures and Especially Prepared Original Articles. Edited by H. R. M. Landis, M.D. Volume One. Twenty-seventh Series, 1917. J. B. Lippincott Company, Philadelphia.

This volume, like its predecessors, contains articles upon Therapeutics, Medicine, Dermatology, Psychiatry, Public Health, Surgery, closing with an article entitled "The Progress of Medicine During the Year 1916."

The articles under Treatment consist in one by Dr. Vincent Lyon upon the Medical Treatment of Gastric and Duodenal Ulcer; another by Dr. R. H. Boggs upon The Treatment of Epithelioma by Radium; and a third by Dr. Curran Pope upon The Medical Treatment of Poliomyelitis. In view of the recent epidemic of this disease, we turn to the pages of Dr. Pope's article with some interest. He speaks of certain experiments which lead him to believe that by the use of non-specific protein substance

it is hoped that he will be able to overcome the influence of the filterable protein of this disease, but adds that at present he is not prepared to state the exact terms upon which this hope is based. Without stating that he has had considerable experience he looks with favor, apparently from a review of the literature, upon the use of so-called serum treatment—that is, using the serum obtained from persons who have already had the disease—and states that there are few drugs which seem to possess any value, save that free purgation should be promptly instituted and laxatives continued during the acute stage of the disease. The reasons for this are not stated. Again he quotes the use of intraspinal injections of adrenalin as recommended by Meltzer. He also advises fomentations applied to the spine at a temperature of 140° to 150° for ten minutes, followed by cold sponge or compress, and again the use of high candlepower electric light, which is not only an analgesic, but also produces a hyperemia, which in turn, he thinks, is followed by a secondary anemia which relieves the congestion of the cord. This seems to us a rather unusual proposition. He advises against the use of plaster-of-Paris casts and all other supports in the acute stage. We are surprised to find he recommends the electrical treatment of poliomyelitis as soon as the paralysis appears, before the temperature is normal. This is certainly in opposition to the opinion of the majority of writers. We are glad to note, however, that he prohibits the use of the faradic current and states that he employs the genuine sinusoidal, using on alternate days the mixed galvanism and faradism. It is certainly wise when faradic current is employed to use the smallest amount which will cause adequate contraction of the muscles.

In the article upon The Treatment of Epithelioma by Radium, Dr. Boggs makes the statement that its therapeutic value cannot be thoroughly understood if it has not been studied with a sufficiently complete and varied range of filtration; he further adds that when properly applied it is the most efficient form of radiation that we have for a depth of from two to three centimeters, but large areas cannot be treated with it, and when it is necessary to do adjacent lymphatic glands it should be supplemented by the Roentgen rays.

ENDOCRINOLOGY. The Bulletin of the Association for the Study of the Internal Secretions. Published quarterly by the Association for the Study of the Internal Secretions, Glendale, Calif.

January (1917) saw the appearance of Vol. I, number 1, of "Endocrinology," a quarterly journal to be devoted exclusively to the study of internal secretions. Whenever the initial number of a new medical journal is offered for the consideration of a medical world, already burdened with certain types of medical publications, both the new journal and the particular portion of medical science that it proposes to cover are scrutinized for an answer to the question, "Is there an actual need for such a publication?" In the present instance it may be pointed out that notwithstanding the hundreds of papers on internal secretion published yearly in divers journals, no journal is available that affords ready access to groupings of current literature on internal secretions. Endocrinopathology and glandular therapy are not exclusively pertinent to any specialty in medicine, but are pertinent to all. To-day the neurologist, the psychologist, the surgeon, the aurist, the dermatologist, the gynecologist, all find the influence of the internal secretory system exerted in the field of their particular activities. Obviously it is advantageous that reports of work relative to the problems of internal secretion in any given specialty should find outlet in the journals given over to that specialty. No one journal may hope to dominate this large and complex problem, and manifestly such is not the desire of "Endocrinology." The editors recognize that their opportunity for greatest service will be found in the function of an unbiased painstaking clearing house. The current literature of internal secretions is in itself formidable and the

total literature is gigantic. Running through both, speculation is rife, and more often than not opinion is mistaken for evidence. If this new journal proves able to cope with the intricacies of the literature alone and affords comprehensive, concise epitomies of diverse investigations in internal secretion, it will be accepted as really needed and of actual service to the medical profession.

M.

A Reference Handbook of the Medical Sciences. Volume VII. Third Edition. William Wood & Company, New York, 1917.

Within the last three decades almost every medical man has become familiar with the Reference Handbook of the Medical Sciences, originally edited by Dr. Buck, but in its latest edition edited by Dr. Stedman. It will be recalled that this handbook is really an encyclopedia of the medical sciences embracing the entire range of scientific and practical medicine and allied science, the articles being contributed by various authors who are qualified to express authoritative opinions. The present volume contains nine hundred and ninety-eight double-column pages, and this publication leaves only one more volume to complete the eight of the series. The previous editions we have already mentioned. This one well maintains the quality and value of the book since its earliest publication.

Amongst other articles of interest is a competent and exhaustive one dealing with the subject of Radioactivity and covering nearly thirteen pages in condensed type. Those who desire further information will find that a bibliography is appended to each important article.

As we said of an earlier volume, this book is not only a credit to its editor and its publishers, but a credit to American medicine, not only because it represents what American medicine can do in the way of medical literature, but also because its revision is a creditable tribute to the appreciation which American medical men have for a standard and yet necessarily costly work. This volume, with its fellows, cannot be too highly recommended, for he who has them may surely feel that he possesses a complete medical library even if he has little else in the way of medical books.

Progressive Medicine. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by H. A. Hare, M.D., Assisted by L. F. Appleman, M.D. Volume I, 1917. Lea & Febiger, Philadelphia, 1917. Price $6.00.

The contents of Volume One of Progressive Medicine for 1917 consists in an article of seventy-six pages by Dr. Charles H. Frazier, of the University of Pennsylvania, upon Surgery of the Head and Neck; one by Dr. George P. Müller, of the Philadelphia Polyclinic, upon Surgery of the Thorax, Excluding Diseases of the Breast, covering thirty pages; another by Dr. John Ruhräh, Professor of Diseases of Children in the College of Physicians and Surgeons of Baltimore, upon Infectious Diseases, Including Acute Rheumatism, Croupous Pneumonia and Influenza, consisting of ninety-three pages; one upon Diseases of Children, by Dr. Floyd M. Crandall, Consulting Physician to the Infants' Hospital of New York, containing thirty-seven pages; and lastly, one upon Rhinology, Laryngology and Otology, by Dr. George M. Coates, Professor of Diseases of the Ear in the Philadelphia Polyclinic, amounting to sixty-one pages.

These articles are written in a narrative form, the authors selecting the best which has been published in the last twelve months in their respective departments, with criticisms and additions made by the writer of the article. The present volume maintains the standard of its predecessors.

A Manual of Therapeutic Exercise and Massage. Designed for the Use of Physicians, Students, and Masseurs. By C. Hermann Bucholz, M.D. Illustrated. Lea & Febiger, Philadelphia, 1917.

This is a first-rate summarization and practical guide to the subjects of which it treats, and provides the information which those named on its title-page need for the proper carrying out of these remedial measures. Altogether there are eighty-nine illustrations showing the application of

various forms of massage and exercise and the tissues which are benefited thereby.

The first part of the book deals with The Physiology of Massage, The Use of Apparatus, and The Various Movements. The last half of the book, or to speak more correctly, the last two-thirds of the book, deals with pathological conditions and the measures which are used to correct them.

We think it may be said that, taking it all in all, this is the best summarization of the subject for the active practitioner that can be found.

NEWER METHODS OF BLOOD AND URINE CHEMISTRY. By R. B. H. Gradwohl, M.D., and A. J. Blaivas. Illustrated. C. V. Mosby Company, St. Louis, 1917. Price $2.50.

The authors of this small clinical laboratory manual, of less than two hundred and fifty pages, have brought together their material in response to a demand from their professional friends who have become keenly interested in laboratory investigation. They do not claim originality for the text, but only that they have collected the major part of the information from widely scattered sources, and, to use their term, "boiled it down into a readily digestible form." The advances in the chemistry of the blood, as they well point out, are proceeding so rapidly that it is difficult to keep the text up to date. Rather wisely, we think, the authors have not attempted to give a great many tests for the same purpose, but have given one method for each test, the one which they think the most advantageous, because the printing of a number of reactions, or tests, having the same end in view confuses the ordinary physician as to the one which is best to employ. At the end of each chapter a very considerable bibliography of recent literature is given. Thus, in the chapter on Sugar in the Blood, not less than sixty-five references to very recent literature are appended, covering American, English, German, and Japanese publications.

As a handy manual for the doctor who has his own clinical laboratory, and nearly every progressive doctor has such a laboratory to-day, the book can be cordially commended.

CORRESPONDENCE.

THE MORPHINE HABIT.

To the Editors of the THERAPEUTIC GAZETTE.

SIRS: I read with great interest the correspondence under the caption "The Treatment of the Morphine Habit," by Dr. W. B. Reed, published in the February issue.

I do not agree with Dr. Reed that a morphine habitué cannot be cured even in five weeks. Such articles have the effect of discouraging the general practitioner in the hope of a radical cure of drug addiction, and as a matter of fact the claims by your correspondent are, according to my experience, unfounded.

To begin with it appears very plainly from Dr. Reed's own statements that he is treating morphinists the same as he does any other chronic case which is not immediately threatening to life—at his office and at great intervals.

I am sure that the office or home treatment of chronic narcotism is doomed to failure and disappointment. In this the best-known authorities are agreed, for all concede that this class of cases are best taken care of in an institution.

I have been in general practice, and for some years past have been resident physician in absolute charge of a large number of drug addicts in an institution exclusively devoted to the treatment of alcoholic and drug addictions. My experience, which extends over several hundred cases, has convinced me that under a rational regimen, hygienic, dietetic, and therapeutic, even aggravated cases of morphinism or similar conditions can be restored to a normal condition in from ten to twenty days, provided the primary underlying factor has ceased to continue or is removed. A patient who

has become addicted to morphine because of an unrecognized cerebral syphilis will not be cured permanently because the phenomena forcing the patient to seek relief in opiates have not been removed. But assuming that this condition has been recognized and treated and removed, the patient has no cause to resume the use of narcotics and will not resume it, if his system has been freed from the noxæ, which we have come to look upon as producers of a vicious circle.

What has been said of cerebral lues applies, of course, to all painful diseases, be they surgical or internal (medical) in character.

The trouble with most general practitioners or non-specialists is that they do not fully appreciate the true pathology of narcotism. They hunt for symptoms rather than a logical chain of causes. Indeed, in chronic narcotism we have no poisoning in the common acceptance of the term, but a low-grade chronic intoxication, which so alters the nervous system as to bring about a continuous state of irritation. Once the cause is removed, and that can be in a scientifically conducted institution, where full control of the patient is afforded, in a comparatively short space of time, the craving for the drug is abolished. The claim that every drug addict is "a neurotic, neurasthenic, moral degenerate, or something of that class" shows a lack of appreciation of the true meaning of these words.

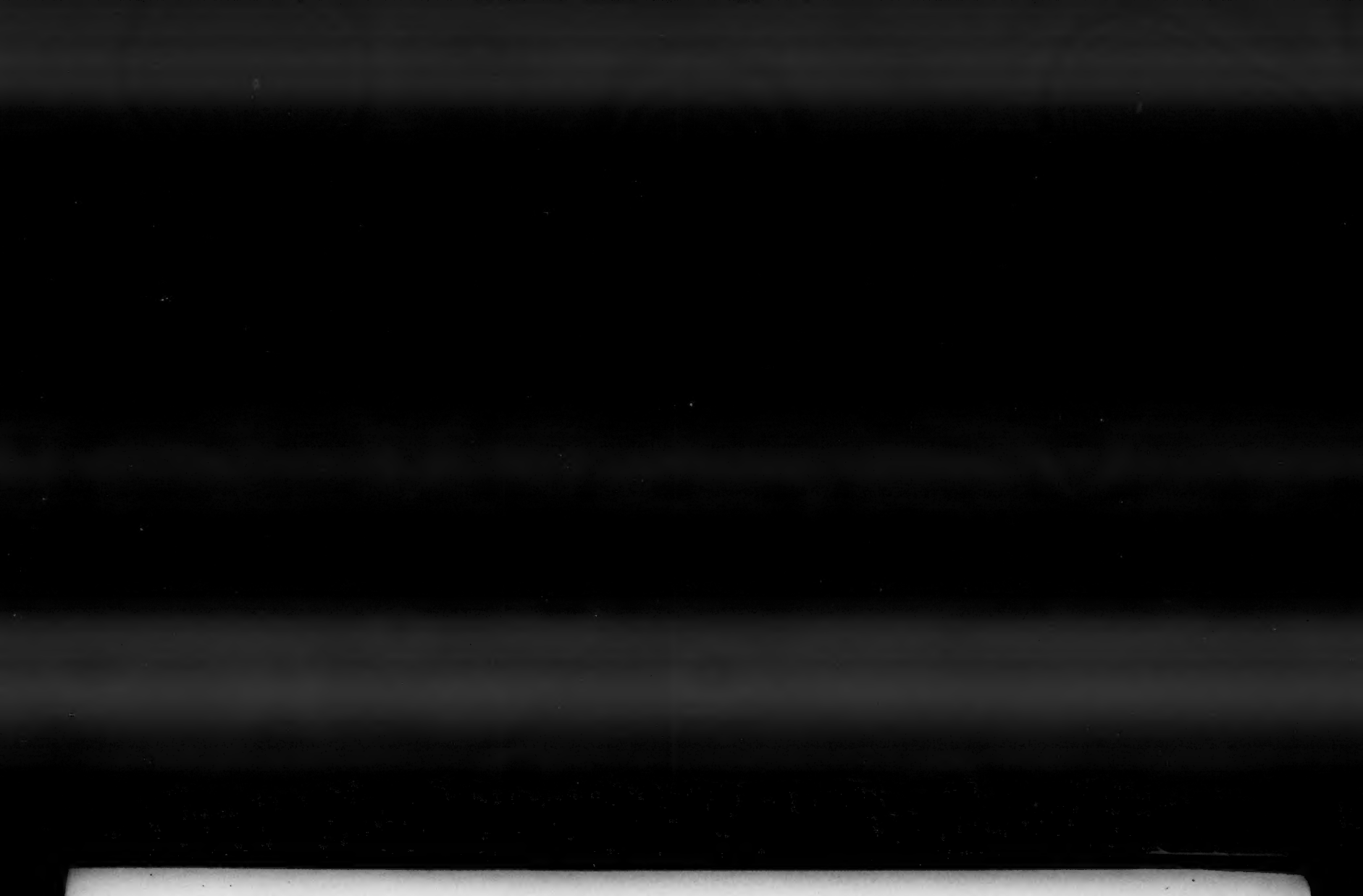
If one take the esthetic and ethical physicians, authors, scientists, editors, teachers, both male and female, who have become addicted to the use of opiates originally taken for the purpose of getting relief from the agonies of some painful disease, if one has seen these brilliant minds, once freed from the noxious influence of the drug and the primary disease, resume their high and useful vocations, then one questions the wisdom of labeling these pure, high-minded persons "moral degenerates."

Yours very truly,

JAMES H. APPLEMAN, M.D.

CHICAGO, ILLINOIS.

NOTES AND QUERIES.

PRACTICAL MEDICINE AND ORIGINAL RESEARCH.

The *Journal-Lancet* for March 15, 1917, contains an address by J. G. Cross, delivered as President of the Hennepin County, Minnesota, Medical Society. In it amongst other good things he says research work is a fetish at present, and every medical faculty considers it a reproach if a report of the result of research work is not forthcoming from its members at regular intervals. The words of Councilman in this respect are worth meditating upon. He draws a sharp distinction between medical teaching, research, and practice. As he aptly remarks, the investigative ability necessary to do research work is often quite independent of its surroundings. It may flourish in out-of-the-way places, as well as under the most favorable conditions. He seems also to question whether results worthy of the effort can be attained simply by saying we shall here and now produce something original. He draws a comparison between it and the production of poetry. As he says, no one would expect by founding an institution for the production of a national school of poetry to make a better lot of poetry than had existed before. Neither have the best productions of art always been the output of art schools. It has recently been said by one of our writers that there is such a vast amount of experimental work appearing and clamoring for recognition that it is absolutely impossible for any one person to keep track of that which pertains to his own particular line of practice alone. After attending a large gathering of medical men and listening to the papers presented for discussion, one almost wishes there could be a universal solvent, an intellectual aqua regia, which would dissolve them all and leave a clear solution. However, we know that it is only through the precipitation and sifting of this vast amount of product that the golden grains of truth are obtained which mark medical progress.